

# 2007 Oregon State University Research Annual Report

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## I. Report Overview

### 1. Executive Summary

In this annual report, the Oregon Agricultural Experiment Station (OAES) will summarize outputs and outcomes from its 31 Planned Programs. The research and extension activities of these programs can be grouped into six focus areas, which are closely aligned with the Strategic Goals of the Oregon State University College of Agriculture: Biobased Products; Ecosystem Services; Food, Nutrition and Health; Sustainable Agriculture and Food Systems; and Rural Communities. The following are highlights from each of these focus areas.

#### Biobased Products

OAES faculty in the Department of Biological and Ecological Engineering are making strides in biological production of bioproducts, biofuels, and hydrogen from sunlight, agricultural and cellulosic feedstocks. Investigators in this area have worked to develop a microbial fuel cell that can use wastewater and sewage to generate electricity; conducted research to allow the production of hydrogen for fuel cells by microorganisms that use solar energy to split water; and find an efficient method of producing bioenergy from mass-produced algae. Their work has been highly publicized in the local and regional press.

#### Ecosystem Services

Soils investigators investigated agronomic methods in Senegal that could be used to improve agricultural production and reliability while advancing long-term soils resource sustainability. Energy flux results showed improved groundwater recharge, increased soil moisture, and improved crop survivability and productivity when a crop is interplanted with *Guiera senegalensis*, a native shrub.

Investigators in the marine resources subprogram conducted research on fishery policy and fishery management reform, as well as on the design of incentive-based fishery management tools for marine protected areas and ecosystem-based management, aquaculture, oceanography, and marine resource technology. One investigator's work was featured in a documentary on a popular cable channel, Animal Planet. Bruce Mate, a pioneer in the use of satellite tracking, was shown tracking tagged gray whale females and their offspring from calving areas off Mexico to feeding grounds in the Arctic. Satellite tracking shows how whales migrate in close proximity to human activities and how their feeding areas have changed in recent years in response to warming in the Bering Sea.

#### Food, Nutrition and Health

The healthy lifestyles subprogram seeks to understand the dietary effects of food nutrients in preventing cancer and heart disease. Emily Ho, a nutrition scientist, investigated the biological and chemical mechanisms that explain the protective power of zinc from DNA damage and oxidative stress. Results from her laboratory indicate that zinc deficiency provides an environment for increased DNA damage, an inability to respond to stress and risks for cancer. This research addresses the importance of getting adequate zinc from zinc-rich foods to improve health.

#### Sustainable Agriculture and Food Systems

This focus area contains a large percentage of the planned programs and includes research and extension activities on agricultural education, animal production systems, crop management, plant biology and genetics, agricultural economics and food science and technology. Carol Mallory-Smith, a weed scientist and recently named fellow of the Weed Science Society, is studying how genes from canola contaminate vegetable crops, the results of which could have an impact on a growing biofuels industry in Oregon. She's also looking at how substances from juniper trees might be able to inhibit the germination of weeds. In addition to her field research, Dr. Mallory-Smith received a grant to develop online courses in integrated pest management. The courses will be designed for both students and agricultural professionals, and the team approach will recognize the interaction among diseases, weeds and insects, as well as the need for system-wide approaches to management tactics.

#### Rural Communities

Work in this area has focused on the impact of intergenerational resource transfers on family and maternal well being; differing access to resources of Hispanic and non-Hispanic families; child care arrangements for preadolescent children; and contributions of non-custodial fathers and the well-being of single mother families. Leslie Richards, assistant professor in the College of Health and Human Sciences, has served as an evaluation consultant on USDA projects. One project helped to support the development of community gardens designed to increase physical activity and support healthy eating patterns of low-income children in a local coastal city.

Research results have been shared through refereed journal articles, abstracts, book and book chapters; theses, local, regional, national and international meetings, symposia and workshops; GIS climate, geophysical and plant maps; and a variety of web pages.

#### Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	43.4	0.0	126.4	0.0
<b>Actual</b>	30.3	0.0	64.3	0.0

## II. Merit Review Process

### 1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

### 2. Brief Explanation

All projects conducted by the OAES are subjected to a peer review process. Each department or branch station is responsible for completing a peer review for all OAES projects submitted for support by state and federal funds (guidance for conducting the review is contained in a policy and procedural manual, available to all faculty and unit leaders). A minimum of three external peer reviews must be received. Project members are required to respond to reviewer comments. The Director or his designee oversees the process for rigor, objectivity, and thoroughness. The Director or his designee must approve all proposals that are submitted by faculty through the OAES.

## III. Stakeholder Input

### 1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

### Brief Explanation

At Oregon, OAES through the College of Agricultural Sciences (CAS) uses several formal and informal avenues to solicit stakeholder input on programs conducted and changes in program direction. Formal bodies convened by the college, departmental or branch stations meet fairly regularly to aid in the direction and guidance of our programs. These tend to take the form of Advisory Committees or Commodity Groups.

CAS and OAES also utilize a multisectoral stakeholder workshop every other year to gather input. Invitees range from industry, government agencies, nonprofits, consumer groups, and faculty (research, teaching, and extension). They come from a cross-section of diverse food systems and natural resources across the state. This meeting is used to balance regional perspectives and needs and develop a statewide program. This process also helps our diverse clientele understand the needs of the state in light of their own perspective.

Additionally, several websites and a general email address operated by CAS, the departments and branch stations also provide opportunities to receive comments and questions from the public, and well as post responses and changes in programs in response to stakeholder input.

Informally, the deans and directors of CAS and OAES receive input while attending farm and station field days around the state, visiting county-based Extension offices, and participating in other "road trips" around the state. We also gather input while attending meetings, seminars, conferences, and other events that congregate our stakeholders. Making our administrative heads directly available to our clientele is an important mechanism to stay relevant and informed.

CAS has also hired an External Relations Director, who organizes alumni and stakeholder events, receives and transmits input from stakeholders, and makes sure responses are delivered. CAS is also experimenting with newer technological methods for gathering input such as blogs.

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## **2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

### **1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

#### **Brief Explanation**

We use field days, formal meeting events, commodity groups and other association groups, faculty and staff, legislative aides, websites, email addresses, relayed messages, surveys, and students to help us identify individual sand goups.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

**Brief Explanation**

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**3. A statement of how the input was considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief Explanation**

{NO DATA ENTERED}

**Brief Explanation of what you learned from your Stakeholders**

Don't forget your established, traditional stakeholders while you seek out new or under-represented clientele.  
 Feedback is important  
 We want direct access to the dean.

**IV. Expenditure Summary**

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	5282570	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
<b>Actual Formula</b>	0	0	1855455	0
<b>Actual Matching</b>	0	0	23539201	0
<b>Actual All Other</b>	0	0	20093891	0
<b>Total Actual Expended</b>	0	0	45488547	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years				
Carryover	0	0	0	0
	0	0	0	0

## V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Economics of Land and Water Use on Private and Public Lands
2	Integrated Production Systems
3	Horticultural Management Systems
4	Basic Plant Biology & Related Topics for Horticulture
5	Animal Health and Disease
6	Improving Agribusiness & Food Marketing Decisions in the Pacific NorthWest
7	Comparative Advantage of U.S. and Oregon Agricultural and Food Industries
8	Microbiology and a Healthy World
9	Consumers, Food Marketing, and Business Strategies
10	Animal and Human Health and Well Being through Nutrition
11	Reproductive Performance of Animals
12	Sustainable Animal Production Systems
13	Alternative Energy Systems and Bioproducts
14	Managing Marine Resources for Sustainable Systems
15	Conservation and Restoration of Aquatic, Marine and Terrestrial Ecosystems
16	Plant and Soil Management in Agricultural Systems
17	Field Crop Pest Management and Biology
18	Plant Breeding, Genetics, Biotechnology and Crop Quality
19	Soil, Water, and Environmental Systems
20	Dryland Cropping Systems
21	Soil and Water Resource Conservation, Management and Engineering
22	Biological Control of Pests Affecting Plants
23	Plant Genome, Genetics, and Genetic Mechanisms
24	Pathogens and Nematodes Affecting Plants (Molecular and Field Programs)
25	Agricultural and Emerging Chemicals: Fate, Effect & Exposure
26	Environmental Chemicals as Transcriptional Modulators: Understanding Health Effects as a Function of
27	Rangeland Ecology and Management
28	Social Change in the Marketplace: Producers, Retailers and Consumers
29	Families, Youth, and Communities
30	Human Nutrition, Food Safety, and Human Health and Well Being
31	New and Improved Food Processing Systems to Ensure a Safe, Wholesome and High-Value Food Supply

**Program #1**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Economics of Land and Water Use on Private and Public Lands

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
605	Natural Resource and Environmental Economics	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.0	0.0	2.8	0.0
<b>Actual</b>	0.2	0.0	0.5	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	59420	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	914179	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	278425	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

This program is designed to use economics to identify the reasons why normal market incentives do not achieve socially desirable outcomes and then suggest ways in which policymakers can change these incentives to achieve desired outcomes. Investigators will also evaluate various policies to determine how individuals are likely to react. Specifically, program investigators examined how national and state (Oregon) land use policies impact the viability of local agricultural economies and environmental resources. Activities include development of theoretical and econometric models, databases, and web survey methods. Results were disseminated through scholarly and non-technical publications, and presented at national and community meetings.

**2. Brief description of the target audience**

Managers of land and water resources in Oregon and the United States  
 Policymakers who determine regulations that govern management of land and water resources.  
 Farm operators and organizations  
 Resource economists  
 Communities  
 Research and Extension Peers

Indirect beneficiaries are:  
 Citizens of Oregon and other states

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	475	1320	55	0
2007	2020	100000	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

Patents listed

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	4	6	10

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	2	20

**Output #2**

**Output Measure**

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Farmers learn how to use water more efficiently - Decision makers obtain models to assess changes in policies that influence supply and cost of water in agricultural and non-agricultural uses - Decision makers obtain regional models to assess market mechanisms governing water and private land-use decisions - Researchers investigate, compare, and integrate the environmental and economic impacts of various land-use policies in Oregon (07), regional, 08, compare, 09, integrate 11

Year	Target	Actual
2007	4	5



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>(1) Provide farm operators with a new set of tools to help them make better irrigation scheduling decisions. - Introduce the idea of deficit irrigation to progressive farmers in Oregon and elsewhere. - Develop models for farmers to schedule irrigation applications each day such that water use is reduced and farm profit is maximized. - Work with irrigation districts and water conservation districts in cooperative projects, as well as provide web-based tools that farmers can access to help in scheduling irrigation applications. - Simplify crop growth models to be easily applied to variety of soils, climates and irrigation technologies and still predict yields with enough accuracy that farmers can profitably use them in making production decision. Ultimately, they directly will decide when and how much to irrigate each field each day during the growing season, and become more aware of the economic tradeoffs between various decisions, making a decision that better utilizes resources and results in higher profit.</p>
2	<p>(2) Produce realistic models that demonstrate the potential gains, and help point to ways that the conflicts between competing goals can be minimized.</p>
3	<p>(3) Develop regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. (3.1) Develop GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. (3.2) Develop a spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.</p>
4	<p>(4) Increase our understanding of the impacts of land use changes on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. A key advance in this research will be to estimate the effects of land-use changes on populations of different wildlife species.</p>

**Outcome #1****1. Outcome Measures**

(1) Provide farm operators with a new set of tools to help them make better irrigation scheduling decisions. - Introduce the idea of deficit irrigation to progressive farmers in Oregon and elsewhere. - Develop models for farmers to schedule irrigation applications each day such that water use is reduced and farm profit is maximized. - Work with irrigation districts and water conservation districts in cooperative projects, as well as provide web-based tools that farmers can access to help in scheduling irrigation applications. - Simplify crop growth models to be easily applied to variety of soils, climates and irrigation technologies and still predict yields with enough accuracy that farmers can profitably use them in making production decision. Ultimately, they directly will decide when and how much to irrigate each field each day during the growing season, and become more aware of the economic tradeoffs between various decisions, making a decision that better utilizes resources and results in higher profit.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

**Outcome #2****1. Outcome Measures**

(2) Produce realistic models that demonstrate the potential gains, and help point to ways that the conflicts between competing goals can be minimized.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

landowners, public officials,

**What has been done**

Investigators evaluate various policies to determine how individuals are likely to react through development of theoretical and econometric models.

**Results**

Investigators have developed a new method for reductions in property values due to regulations adopted under a statewide initiative.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

**Outcome #3****1. Outcome Measures**

(3) Develop regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. (3.1) Develop GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. (3.2) Develop a spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
605	Natural Resource and Environmental Economics

**Outcome #4****1. Outcome Measures**

(4) Increase our understanding of the impacts of land use changes on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. A key advance in this research will be to estimate the effects of land-use changes on populations of different wildlife species.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

This program is designed to use economics to identify the reasons why normal market incentives do not achieve socially desirable outcomes and then suggest ways in which policymakers can change these incentives to achieve desired outcomes.

**What has been done**

Program investigators examined how national and state (Oregon) land use policies impact the viability of local agricultural economies and environmental resources. Activities include development of theoretical and econometric models.

**Results**

Research on the effect of Conservation Reserve Program on land values provides information for the design of permanent easement programs.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
605	Natural Resource and Environmental Economics

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

## **V(l). Planned Program (Evaluation Studies and Data Collection)**

### **1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

### **Evaluation Results**

### **Key Items of Evaluation**

**Program #2**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Integrated Production Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships			12%	
111	Conservation and Efficient Use of Water			12%	
121	Management of Range Resources			5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			12%	
204	Plant Product Quality and Utility (Preharvest)			1%	
205	Plant Management Systems			33%	
216	Integrated Pest Management Systems			25%	
<b>Total</b>				100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.0	0.0
<b>Actual</b>	0.0	0.0	1.8	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	43899	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	675384	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	129546	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The ultimate goal of this program is to produce an agricultural system that is highly competitive in the global economy but remains in harmony with the environment. Investigators conducted sustainable management trial for important crops and potential alternate crops for the Treasure Valley including onions, sugar beets, alfalfa, small grains and the alternative crops: soybeans, poplars, and wildflower seeds. Other field trials examined irrigation, fertility, disease management, and cultivar differences on potato (*Solanum tuberosum* L.) yield, grade, and other quality attributes. Results from this program were disseminated through field days and publications, and presented to different commodity groups.

**2. Brief description of the target audience**

- growers
  - community leaders
  - extension educators.
- commercial producers.
- policy makers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	100	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	4	4

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS - herbicides that can be safely and efficaciously used in different crops - knowledge about the biology of yellow nutsedge under local conditions - innovations that mitigates the detrimental effect of Verticillium wilt, probably the most limiting disease of potato in the Treasure Valley.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	1

**Output #2****Output Measure**

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - onion germplasm for year-round marketing. - OSU and ARS breeding program partnership develops at least one varietal selection for potato adaptation to the Treasure Valley. Selections at the Malheur Experiment Station, including colored flesh potato varieties, may have special market opportunities. - alkaline tolerant poplar tree varieties developed for saw log production on poor and sloping soils with the aid of drip irrigation.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #3****Output Measure**

- SCHOLARLY excellence through papers and reports, book chapters, presentations, service, on boards/panels and to local clientele, awards and honors

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	20

**Output #4****Output Measure**

- Develop improved animal and plant production systems for growers: - subsurface drip irrigation or different bed conformation works with potatoes. - automated systems use soil moisture monitoring to override fixed schedule drip irrigation systems when the soil was too wet avoiding leaching water and nitrate to groundwater. - efficient use of soil nitrate and the other available N sources

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	1



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Percentage of Growers become aware of the level of management required to deal with yellow nutsedge well as risks associated with this pest in areas where is just now becoming established.
2	Number of growers understand the factors affecting metham sodium activity against yellow nutsedge.
3	Growers are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation.
4	The station has proved to growers and public sector that micro irrigation can achieve environmental benefits if made economically feasible through reductions in other costs not related to the added costs of the micro irrigation system and improvements in crop yield or quality.
5	Growers apply metham sodium when environmental conditions are more favorable for effective activity against yellow nutsedge.
6	Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation. and achieve efficient use of soil nitrate and the other available N sources under drip irrigation.
7	Through appropriate application of herbicides, producers reduce 50% of the yellow nutsedge tubers they must manage in following crops.
8	Micro irrigation reduces percentage of water use, leaving more water in streams and reservoirs, and reduces surface water contamination of streams and groundwater contamination by nitrate and pesticides

**Outcome #1****1. Outcome Measures**

Percentage of Growers become aware of the level of management required to deal with yellow nutsedge well as risks associated with this pest in areas where is just now becoming established.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems

**Outcome #2****1. Outcome Measures**

Number of growers understand the factors affecting metham sodium activity against yellow nutsedge.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
216	Integrated Pest Management Systems
205	Plant Management Systems

**Outcome #3****1. Outcome Measures**

Growers are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	2	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #4****1. Outcome Measures**

The station has proved to growers and public sector that micro irrigation can achieve environmental benefits if made economically feasible through reductions in other costs not related to the added costs of the micro irrigation system and improvements in crop yield or quality.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
111	Conservation and Efficient Use of Water

**Outcome #5****1. Outcome Measures**

Growers apply metham sodium when environmental conditions are more favorable for effective activity against yellow nutsedge.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #6**

**1. Outcome Measures**

Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation. and achieve efficient use of soil nitrate and the other available N sources under drip irrigation.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #7****1. Outcome Measures**

Through appropriate application of herbicides, producers reduce 50% of the yellow nutsedge tubers they must manage in following crops.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

## Results

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems

### Outcome #8

#### 1. Outcome Measures

Micro irrigation reduces percentage of water use, leaving more water in streams and reservoirs, and reduces surface water contamination of streams and groundwater contamination by nitrate and pesticides

#### 2. Associated Institution Types

- 1862 Research

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

#### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

**What has been done**

**Results**

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
111	Conservation and Efficient Use of Water
216	Integrated Pest Management Systems
102	Soil, Plant, Water, Nutrient Relationships

### V(H). Planned Program (External Factors)

#### External factors which affected outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

#### Brief Explanation

**V(l). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #3**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Horticultural Management Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	65%		65%	
216	Integrated Pest Management Systems	35%		35%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	24.1	0.0	6.8	0.0
<b>Actual</b>	24.0	0.0	6.8	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	143718	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1611762	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1303684	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**



The ultimate goal of this program is to integrate practices, cultivars, and technologies to achieve greater efficiencies, integrated pest management, ecological and organic production, and products that meet market and consumer demand while considering impacts on the environment, worker protection, human health and livelihoods. The production subprogram improved horticultural production efficiencies with high density blueberry and cherry plantings combined with appropriate pruning or training techniques, new hazelnut cultivars resistant to eastern filbert blight, early season cane pruning of blackberry, water conservation in nursery production systems, ecosystem services such as pollinator habitat in gardens and landscapes and sustainable viticulture systems. The IPM subprogram has developed systems using cover crops, tillage and timing of cultural practices to alter pest incidence in vegetable crop rotations, including carabid beetles that cache and consume weed seed. Regional and or automated pest forecasting systems were improved for insects and disease monitoring. Insects causing "short shoot syndrome" in vineyards were identified along with cultural and control practices. Hazelnut cultivars that resist eastern filbert blight and exhibit improved kernel quality are being propagated in commercial nurseries for planting throughout Oregon. The organic subprogram was extended with a participatory on-farm potato project highlighting variety taste tests, a nitrogen calculator, a legume-based cover crop trial, a mustard interplant trial to control dandelion and sowthistle in strawberries, a soil biology and health study involving amendments in orchard systems, and a launch of eOrganic as a national website to share information and technology. Information was disseminated through peer-reviewed journals, presentations at national meeting and field days and through extension activities.

## 2. Brief description of the target audience

Farm/crop/landscape managers, professional field representatives, students (undergraduates and graduate students or post-docs); commodity commissions, gardeners/Master Gardeners™; colleagues in the department, university, and USDA on campus; certification groups, NGOs, peers nationally and internationally, and agency personnel. ..(horticulture, woodlots, and animal management with emphasis on pest management and organic practices for local markets)

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	23170	7230250	210	0
2007	0	0	0	0

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	3	14	17

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	10	25

**Output #2****Output Measure**

- DEVELOP AND ENHANCE VOLUNTEER PROGRAMS FOR BROADER APPLICATION OF RESEARCH AND EXTENSION INFORMATION - Reach Master Gardners (new, past, and current) through MG training programs and materials, websites, and other distance education programs Year Target benchmark 2007 MG Online Training offered 2008 Assortment of web-based modules developed and adapted for Ecampus to enlarge user groups/revenue. 2009 MG program training offered for credit and/or certification 2010 OSU Urban and Community Horticulture Website refined to reach new audiences and access impact. 2011 'Green' industry uses plants adapted to specific sites and for specific environmental purposes.

Year	Target	Actual
2007	5000	1

**Output #3****Output Measure**

- DEVELOP DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE. - Develop new databases and 3000 "most asked questions" for eXtension

Year	Target	Actual
2007	0	1

**Output #4****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - Provide growers with improved production efficiency knowledge and practices regarding: ..nutrient budget recommendations ..chemical controls ..complete feasibility study of community based micro processing centers for agricultural products ..off-season production methods ..grafted stock ..water conservation and recycling ..soil quality parameters - Make known to practioners a variety of improved production practices, such as new cultivars for berries, new rootstocks, information on cold hardiness, disease resistance, chemical control of pests available; improved weed management, nitrogen use, water use, - Develop green or organic practices for industry ..prioritize programs 11..green industry uses plants adapted to specific sites and specific environmental purposes 11..ecological orchard systems evaluated ..complete organic cover cropapplied research - Establish statewide small farms extension program with new positions.

Year	Target	Actual
2007	25	20

**Output #5****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - create, improve or evaluate pest management systems for commodity groups 09..bio-based pest control programs ..disease contained or controlled ..weed management with improved herbicides and cultural management

Year	Target	Actual
2007	0	0

**Output #6****Output Measure**

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Complete feasibility study of community based micro processing centers for agricultural products

Year	Target	Actual
2007	0	0

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and aboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.
2	Practitioners will learn new cultural practices, innovations, pest control, and organic systems to remain competitive. They will also learn marketing approaches for local markets and community food systems. Commercial and non-commercial small farms will regularly utilize a variety of electronic information systems that provide immediate assistance and improve the face to face support when needed.
3	Practitioners will modify current practices to consider sustainable practices and decisions, stewardship of natural resources, and consequences of plants/plant communities in horticultural landscapes, riparian areas, watersheds, and social communities or neighborhoods. Citizens will experience horticultural therapy and health at hospitals, community gardens that feed the poor, recycling of community waste, and projects that engage troubled youth and Master Gardeners™.
4	Growers are expected to adopt improved practices and cultivars Growers are expected to adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use
5	Ecological landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. Social change will occur through new perceptions of 'green' technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with 'green' technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy.

6	<p>Environmental impacts in food/farm systems include reducing surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. Environmental quality will be improved: for nurseries, greenhouse, managed turf areas, and berry farms. through enhanced soil health; improved irrigation, nutrient, and pest management; and organic production systems. for vegetable farms with cover crops, soil quality, reduced tillage, while achieving grape quality and rootstock evaluation, although increasing acreages may be seen as degrading oak savannas in Oregon. in tree fruit orchards, including high density orchards, through the release of hazelnut cultivars that resist Eastern Filbert blight and integrated and organic fruit production practices. on small acreage livestock and horticulture farms with adoption of environmentally sound management practices. Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. Social change will improve economic stability of families and quality of life with improved cropping systems. Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. Economic viability of farmers markets will be enhanced by utilizing the results of market conducted consumer research. Applied research and education programs and community food systems will be fostered with products produced and sold locally.</p>
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**Outcome #1****1. Outcome Measures**

Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and arboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1000	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #2****1. Outcome Measures**

Practitioners will learn new cultural practices, innovations, pest control, and organic systems to remain competitive. They will also learn marketing approaches for local markets and community food systems. Commercial and non-commercial small farms will regularly utilize a variety of electronic information systems that provide immediate assistance and improve the face to face support when needed.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	100	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #3****1. Outcome Measures**

Practitioners will modify current practices to consider sustainable practices and decisions, stewardship of natural resources, and consequences of plants/plant communities in horticultural landscapes, riparian areas, watersheds, and social communities or neighborhoods. Citizens will experience horticultural therapy and health at hospitals, community gardens that feed the poor, recycling of community waste, and projects that engage troubled youth and Master Gardeners™.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	1000	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems

**Outcome #4****1. Outcome Measures**

Growers are expected to adopt improved practices and cultivars. Growers are expected to adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	75	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The ultimate goal of this program is to integrate practices, cultivars, and technologies to achieve greater efficiencies, integrated pest management, ecological and organic production, and products that meet market and consumer demand while considering impacts on the environment, worker protection, human health and livelihoods.

**What has been done**

The production subprogram improved horticultural production efficiencies with high density blueberry and cherry plantings combined with appropriate pruning or training techniques, new hazelnut cultivars resistant to eastern filbert blight, early season cane pruning of blackberry, water conservation in nursery production systems, ecosystem services such as pollinator habitat in gardens and landscapes and sustainable viticulture systems. The IPM subprogram has developed systems using cover crops, tillage and timing of cultural practices to alter pest incidence in vegetable crop rotations, including carabid beetles that cache and consume weed seed. Regional and or automated pest forecasting systems were improved for insects and disease monitoring. Insects causing 'short shoot syndrome' in vineyards were identified along with cultural and control practices. Hazelnut cultivars that resist eastern filbert blight and exhibit improved kernel quality are being propagated in commercial nurseries for planting throughout Oregon. The organic subprogram was extended with a participatory on-farm potato project highlighting variety taste tests, a nitrogen calculator, a legume-based cover crop trial, a mustard interplant trial to control dandelion and sowthistle in strawberries, a soil biology and health study involving amendments in orchard systems, and a launch of eOrganic as a national website to share information and technology.

**Results**

The plant production subprogram improved horticultural production efficiencies in blueberries, hazelnuts, cherries, vegetables and viticulture systems. Pest management in horticultural cropping systems require high quality products, low pest tolerance, and extremely low damage thresholds. IPM strategies continue to shift toward ecosystem management of pests within crops and adjacent areas. The IPM subprogram has developed systems using cover crops, tillage and timing of cultural practices to alter pest incidence in vegetable crop rotations, monitor regional dynamics and multiple organisms. Oregon producers of horticultural crops continue to search for viable or new markets as global economics and personal interests in the environment, labor safety, and other factors change. Consumer interest and demand for organic foods also is a changing with retail sales increasing 20% per year over the last five years. The organic subprogram developed production and educational programs that involve farmers and educational curricula for urban and community horticulture.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #5****1. Outcome Measures**

Ecological landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. Social change will occur through new perceptions of 'green' technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with 'green' technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy.

## 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2500	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

**What has been done**

**Results**

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

## Outcome #6

### 1. Outcome Measures



Environmental impacts in food/farm systems include reducing surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. Environmental quality will be improved: for nurseries, greenhouse, managed turf areas, and berry farms. through enhanced soil health; improved irrigation, nutrient, and pest management; and organic production systems. for vegetable farms with cover crops, soil quality, reduced tillage, while achieving grape quality and rootstock evaluation, although increasing acreages may be seen as degrading oak savannas in Oregon. in tree fruit orchards, including high density orchards, through the release of hazelnut cultivars that resist Eastern Filbert blight and integrated and organic fruit production practices. on small acreage livestock and horticulture farms with adoption of environmentally sound management practices. Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. Social change will improve economic stability of families and quality of life with improved cropping systems. Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. Economic viability of farmers markets will be enhanced by utilizing the results of market conducted consumer research. Applied research and education programs and community food systems will be fostered with products produced and sold locally.

## 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1500	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (university/college policies)

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Retrospective (post program)
- During (during program)

**Evaluation Results****Key Items of Evaluation**

**Program #4****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Basic Plant Biology &amp; Related Topics for Horticulture

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms			35%	
204	Plant Product Quality and Utility (Preharvest)			28%	
206	Basic Plant Biology			37%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.5	0.0
<b>Actual</b>	0.0	0.0	5.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	39321	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	604950	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	791592	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

A basic goal of this program is to understand plant genomes, genetics, genetic mechanisms, and genetic resources to improve plant product quality and utility. A second goal is to understand plants and plant ecology to improve biological efficiencies and reduced abiotic stresses, disease resistance, and or the way plants function in managed ecosystems. Investigators conducted research and taught courses involving the plant genome, genetics, and genetic mechanisms, plant product quality and preharvest, and basic plant biology that includes basic processes and mechanisms of ecology in managed ecosystems. Information was disseminated through presentations, seminars, professional meetings, undergraduate and graduate courses and publications.

**2. Brief description of the target audience**

Colleagues in the department, university, and USDA on campus; research peers nationally and internationally; students (undergraduates and graduate students or post-docs); commodity commissions; and potential businesses in Oregon.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	0	0	0	0
2007	1800	2050	10	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	2
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	19	19

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - disease resistance - defense pathways - transgenic lines ofr higher tolerances, e.g., freezing, morphology and yields - microarray analysis of genes

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #2****Output Measure**

- SCHOLARLY excellence through refereed articles, conference papers, competitive proposals, organizing scientific meetings, serve on scientific panels and national boards.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	30

**Output #3****Output Measure**

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - hazelnut - beans - snap pea - tomato - apples - broccoli - organic lines

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	8	8

**Output #4****Output Measure**

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS (percent) - seed development and germination - seed development-associated genes and homologues of these genes

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #5****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - precision management systems in vineyards, with nutrition component

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peers learn about genes and genetic resources for breeding, new sources of resistance
2	Growers learn about new hazelnut cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online allow growers to access information quickly
3	Peers are made aware of the antioxidant effects of various carotenoids and flavonoids, and that flavonoids have a significantly greater impact on antioxidant effect compared to carotenoids; while stakeholders are given additional new knowledge about human health benefits, disease resistance, and breeding for organic systems of vegetables.
4	Growers are more aware of issues related to precision horticulture, mineral nutrition, and fundamental aspects of data analysis.
5	Natural resource industry gains basic understanding of restoration processes in Pacific wetlands and riparian habitat, of the ecosystem services associated with these restorations, and of conservation bio-control strategies. Also, the conservation sector is made aware of a user-friendly tool to assess ecosystem services.
6	Adoption of new varieties and cultivars reduce yield losses and expenses, rejuvenate orchards and achieve better productivity and efficiency: Breeders incorporate Botrytis and Sclerotinia resistance genes into crop species via traditional breeding or transgenic plants to reduce yield losses and expenses for chemical fungicides. Growers plant transgenic frost-tolerant potato varieties Growers establish new orchards with plantings of EFB resistant cultivars to reduce production costs and provide environmental benefits (less fungicide applications, etc.), micropropagate instead of grafting and layering to propagate larger numbers of trees in shorter time, and Oregon's hazelnut industry is able to effectively compete on world market with new varieties Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.
7	Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool.
8	Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.
9	Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.
10	Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides.

**Outcome #1****1. Outcome Measures**

Peers learn about genes and genetic resources for breeding, new sources of resistance

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	20	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #2****1. Outcome Measures**

Growers learn about new hazelnut cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online allow growers to access information quickly

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	50	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Horticulture research is fundamental to improving fruit, vegetable, berry, nut, nursery crops and landscape ecosystems in Oregon. This program considers ways to protect, enrich and manage functional ecosystems using plants while ensuring livelihoods, lifestyles, and health of humans and the environment. Results and discoveries are used to improve horticultural cultivars.

**What has been done**

Investigators have developed new cultivars.

**Results**

New hazelnut and vegetable cultivars have reduced crops losses or the need for sprays to control some diseases resulting in economic benefits for farmers and environmental improvements. Hazelnut and vegetable growers plant new cultivars as soon as they are released from breeding programs

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
204	Plant Product Quality and Utility (Preharvest)
206	Basic Plant Biology
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #3****1. Outcome Measures**

Peers are made aware of the antioxidant effects of various carotenoids and flavonoids, and that flavonoids have a significantly greater impact on antioxidant effect compared to carotenoids; while stakeholders are given additional new knowledge about human health benefits, disease resistance, and breeding for organic systems of vegetables.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	20	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #4****1. Outcome Measures**

Growers are more aware of issues related to precision horticulture, mineral nutrition, and fundamental aspects of data analysis.

**2. Associated Institution Types**

•1862 Research



**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Horticulture research is fundamental to improving fruit, vegetable, berry, nut, nursery crops and landscape ecosystems in Oregon. This program considers ways to protect, enrich and manage functional ecosystems using plants while ensuring livelihoods, lifestyles, and health of humans and the environment. Results and discoveries are used to improve horticultural cultivars, shared with breeders to improve product quality and reduce plant stress or pest incidence, or utilized in managed ecosystems such as watersheds and urban or rural landscapes.

**What has been done**

Investigators improve biological efficiencies and reduced abiotic stresses, disease resistance, and or the way plants function in managed ecosystems. Investigators conducted research and taught courses involving the plant genome, genetics, and genetic mechanisms, plant product quality and preharvest, and basic plant biology that includes basic processes and mechanisms of ecology in managed ecosystems.

**Results**

Plant breeders use disease resistant and product quality genes, markers, and other information derived from the genome, genetics, and molecular research programs. Plant nutrition research now considers the effects of crop load, cultural practices, and seasonal factors into interpretive schemes to evaluate nutritional status with regard to yield and quality of horticultural crops. A better understanding of nitrogen (N) cycling and the importance of stored N within perennial plants has led to reduction in N use in tree fruits. Precision agriculture technologies using GIS, GPS and remote sensing have led to growers and service industries providing this information to improve production efficiencies and environmental safety.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
206	Basic Plant Biology
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #5****1. Outcome Measures**

Natural resource industry gains basic understanding of restoration processes in Pacific wetlands and riparian habitat, of the ecosystem services associated with these restorations, and of conservation bio-control strategies. Also, the conservation sector is made aware of a user-friendly tool to assess ecosystem services.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	20	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

A second goal is to understand plants and plant ecology to improve biological efficiencies and reduced abiotic stresses, disease resistance, and or the way plants function in managed ecosystems. This program considers ways to protect, enrich and manage functional ecosystems using plants while ensuring livelihoods, lifestyles, and health of humans and the environment. Results and discoveries are used to improve horticultural cultivars, shared with breeders to improve product quality and reduce plant stress or pest incidence, or utilized in managed ecosystems such as watersheds and urban or rural landscapes.

**What has been done**

Investigators have developed a user-friendly 'ecosystem services calendar.'

**Results**

The 'ecosystem services calculator' has the potential to facilitate market-based conservation practices such as mitigation banking and effluent trading.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
206	Basic Plant Biology
204	Plant Product Quality and Utility (Preharvest)

**Outcome #6****1. Outcome Measures**

Adoption of new varieties and cultivars reduce yield losses and expenses, rejuvenate orchards and achieve better productivity and efficiency: Breeders incorporate Botrytis and Sclerotinia resistance genes into crop species via traditional breeding or transgenic plants to reduce yield losses and expenses for chemical fungicides. Growers plant transgenic frost-tolerant potato varieties Growers establish new orchards with plantings of EFB resistant cultivars to reduce production costs and provide environmental benefits (less fungicide applications, etc.), micropropagate instead of grafting and layering to propagate larger numbers of trees in shorter time, and Oregon's hazelnut industry is able to effectively compete on world market with new varieties Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
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201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

**Outcome #7****1. Outcome Measures**

Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
206	Basic Plant Biology

**Outcome #8****1. Outcome Measures**

Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done****Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
204	Plant Product Quality and Utility (Preharvest)

**Outcome #9****1. Outcome Measures**

Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done****Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

**Outcome #10****1. Outcome Measures**

Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
206	Basic Plant Biology

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #5**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Animal Health and Disease

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems			1%	
311	Animal Diseases			72%	
502	New and Improved Food Products			1%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			12%	
722	Zoonotic Diseases and Parasites Affecting Humans			1%	
723	Hazards to Human Health and Safety			13%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	2.3	0.0
<b>Actual</b>	0.0	0.0	2.4	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	37915	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	583332	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2409710	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.

- Assessments.

- Develop Products, Resources.

**2. Brief description of the target audience**

- farmers (terrestrial and aquatic), producers, ranchers
- veterinarians
- general public
- vaccine producers
- seafood producers
- microbial and medical researchers
- public health officials

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	1000	0	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	10	10

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - genomic sequencing and cloning of viruses (1a/b) and bacteria to understand protein generation and control and other molecular mechanisms of infection, expression, and spread

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	4

**Output #2****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS –diagnostic tools and effective vaccines, e.g, recombinant vaccine against influenza virus or potential experimental vaccine for John's disease – studies to establish the degree of permissiveness of pigs to infection with Asian strains of HPAI H5N1 and their potential role in the emergence of pandemic strains.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	2	2

**Output #3****Output Measure**

- EFFECTS ON AND PROTECTION OF HEALTH Output Measure – efficacious chitosan bandages of different formulations for control of hemorrhaging and infection

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #4****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	30	20



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Researchers gain information about how viruses and bacteria operate in animals and shellfish: - the different pathways for influenza occurrence and pathogenesis - genetic transformation system for <i>C. suis</i> . - molecular mechanisms underlying <i>Vibrio</i> bacterial-shellfish interaction - how SPO0A regulates CPE synthesis - M. paratuberculosis interacts with the intestinal mucosa
2	Knowledge obtained for diagnostic tools for detection and control - BVDV persistent infection in cattle and alpaca. - generation of recombinant vaccine for type A influenza virus
3	Medical personnel learn about merits of chitosan bandages
4	Industry adoption of new diagnostic methods and vaccine and bandage products - Vaccine production industry adopt breakthrough recombinant vaccine methods - Early treatment of BVDV would better control the disease - Adoption of chitosan bandages would help treat acute injuries - therapy and possibly the development of live, attenuated chlamydial strains for vaccination.
5	New techniques will change how we manage diseases - Understanding <i>Vibrio</i> ecology will change how the industry handles post-harvest treatment of shellfish - Better prevention of flu virus - More effective programs for public health measures, personal protection, and clinical therapies for flu - Better control over <i>Clostridium</i> , by modulating SPO0A-CPE interactions for therapeutic purposes - Better and more efficacious practices of prevention of Johne's disease within the cattle industry
6	Lives would be saved or made safer through recombinant flu vaccine, Chitosan-based bandages, and reduction/elimination of <i>Vibrio</i> presence in shellfish. Furthermore, preparedness in anticipation of zoonotic outbreaks of avian influenza and better health promotion.
7	Up to \$20-57 million per million calvings could be saved through control of BVDV and dramatic savings in annual costs due to early diagnosis and control of Johne's disease and <i>Clostridium</i>

**Outcome #1****1. Outcome Measures**

Researchers gain information about how viruses and bacteria operate in animals and shellfish: - the different pathways for influenza occurrence and pathogenesis - genetic transformation system for *C. suis*. - molecular mechanisms underlying *Vibrio* bacterial-shellfish interaction - how SPO0A regulates CPE synthesis - *M. paratuberculosis* interacts with the intestinal mucosa

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

By elucidating the specific survival and adherence mechanisms displayed by *Vibrio* species in shellfish, specific treatments could be devised to disrupt that interaction.

**What has been done**

Investigating the different cellular processes that are activated in bacteria when they associate with shellfish

**Results**

It is likely that, in nature, vibrios encounter a variety of stimuli (including self-generated quorum sensing signals) that trigger differential gene expression.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
722	Zoonotic Diseases and Parasites Affecting Humans
311	Animal Diseases
723	Hazards to Human Health and Safety
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
502	New and Improved Food Products

**Outcome #2****1. Outcome Measures**

Knowledge obtained for diagnostic tools for detection and control - BVDV persistent infection in cattle and alpaca. - generation of recombinant vaccine for type A influenza virus

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	2

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The consequences of disease have severe implications, both on the economics of agriculture as well as on public health.

**What has been done**

generation of recombinant vaccine for type A influenza viruses using avian infectious laryngotracheitis virus as a vector; determination of the genetic difference between alpaca BVDV and bovine BVDV

**Results**

Investigations continue in this area.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

**Outcome #3****1. Outcome Measures**

Medical personnel learn about merits of chitosan bandages

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

This work will help to bring chitosan dressings into new markets including veterinary medicine.

**What has been done**

development and testing of new uses for chitosan formulations and other planned studies include veterinary uses of bandages and bioabsorption studies in animals

**Results**

research continues to provide much needed information on chitosan based dressings.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
722	Zoonotic Diseases and Parasites Affecting Humans

**Outcome #4****1. Outcome Measures**

Industry adoption of new diagnostic methods and vaccine and bandage products - Vaccine production industry adopt breakthrough recombinant vaccine methods - Early treatment of BVDV would better control the disease - Adoption of chitosan bandages would help treat acute injuries - therapy and possibly the development of live, attenuated chlamydial strains for vaccination.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
311	Animal Diseases

**Outcome #5****1. Outcome Measures**

New techniques will change how we manage diseases - Understanding Vibrio ecology will change how the industry handles post-harvest treatment of shellfish - Better prevention of flu virus - More effective programs for public health measures, personal protection, and clinical therapies for flu - Better control over Clostridium, by modulating SPO0A-CPE interactions for therapeutic purposes - Better and more efficacious practices of prevention of Johne's disease within the cattle industry

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans
723	Hazards to Human Health and Safety
307	Animal Management Systems
311	Animal Diseases

**Outcome #6****1. Outcome Measures**

Lives would be saved or made safer through recombinant flu vaccine, Chitosan-based bandages, and reduction/elimination of Vibrio presence in shellfish. Furthermore, preparedness in anticipation of zoonotic outbreaks of avian influenza and better health promotion.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
311	Animal Diseases
723	Hazards to Human Health and Safety
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans
307	Animal Management Systems

**Outcome #7****1. Outcome Measures**

Up to \$20-57 million per million calvings could be saved through control of BVDV and dramatic savings in annual costs due to early diagnosis and control of Johne's disease and Clostridium

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #6**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Improving Agribusiness & Food Marketing Decisions in the Pacific NorthWest

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation			10%	
604	Marketing and Distribution Practices			80%	
607	Consumer Economics			10%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	1.0	0.0
<b>Actual</b>	0.0	0.0	1.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	17477	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	268880	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	171401	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Conduct Research Experiments.

- Conduct Workshops, meetings.
- Deliver Services.
- Develop Products, Curriculum, Resources.
- Provide Training.
- Provide Counseling.
- Assessments.
- Partnering.

**2. Brief description of the target audience**

- food and agri-business owners
- marketing managers
- managers in distribution and retail
- entrepreneurs with start-up ideas
- stakeholders in agri-tourism
- stakeholders in banks, trusts, foundations
- stakeholders in industry associations

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	200	1000	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	2	2

**V(F). State Defined Outputs**

**Output Target**



**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	16	5

**Output #2****Output Measure**

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - studies to provide results that link packaging design elements to the brand impressions formed by consumers. - studies will examine dimensions of place (e.g., region) equity in terms of benefits consumer desire in various food products. - comparative analysis of how consumers perceive family and non-family businesses, along with an investigation of how this perception extends to relevant concepts such as trust, satisfaction and loyalty. - studies on how to make visiting virtual stores a most stimulating and pleasing experience that actually generates sales.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	4

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	marketers learn value of customized and actionable marketing research and on which design elements in the package design process to consider for creating specific consumer brand impressions (Packaging as a low-cost point-of-sales stimulus); awareness of research program and its benefits increases; marketers acquire knowledge and skills for identifying and coping with opportunities and challenges
2	Communication improve between marketing executives and their creative counterparts, and between food brands and the consumers that they serve; marketing behavior in food and agri-businesses changes; marketing practices become more market-oriented and market-driven.
3	improved marketing understanding increases economic viability of food and agri-businesses and overall quality of life

**Outcome #1****1. Outcome Measures**

marketers learn value of customized and actionable marketing research and on which design elements in the package design process to consider for creating specific consumer brand impressions (Packaging as a low-cost point-of-sales stimulus); awareness of research program and its benefits increases; marketers acquire knowledge and skills for identifying and coping with opportunities and challenges

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

**Outcome #2****1. Outcome Measures**

Communication improve between marketing executives and their creative counterparts, and between food brands and the consumers that they serve; marketing behavior in food and agri-businesses changes; marketing practices become more market-oriented and market-driven.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
604	Marketing and Distribution Practices

**Outcome #3****1. Outcome Measures**

improved marketing understanding increases economic viability of food and agri-businesses and overall quality of life

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
604	Marketing and Distribution Practices

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

-

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #7**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Comparative Advantage of U.S. and Oregon Agricultural and Food Industries

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
606	International Trade and Development			90%	
609	Economic Theory and Methods			10%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	0.9	0.0
<b>Actual</b>	0.0	0.0	0.9	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	22275	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	419623	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	59412	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Methods developed to empirically assess the effect of market structure of productivity growth and the latter's effect on international trade in agricultural and food industries. Output dissemination includes professional articles in reputed journals and presentations to international, national and regional meetings of professional associations.

**2. Brief description of the target audience**

Policymakers  
 Agricultural and processed food industries  
 agricultural economists

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	10	100	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	2	2

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	0

**Output #2**

**Output Measure**

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Provide information to producer groups on factors shaping global markets. (G) a – use total factor productivity to measure technological strength of U.S. agriculture and processed food industries b – show productivity-convergence effects resulting from product trade and foreign direct investment (channels of international knowledge flow and rate of productivity convergence) – Model shows key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	1

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.
2	We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. - Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. - Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large. - Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade.
3	The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). If productivity convergence is indeed rapid and unlimited, then policy makers should focus on instruments to alleviate painful adjustment likely in farm and rural communities. In addition, identifying beneficiaries and the extent of their gains allow for transferring some of the gains to affected communities.
4	Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.



**Outcome #1****1. Outcome Measures**

Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The change in knowledge generated by the project includes an improved understanding of the sources and consequences of productivity growth in agricultural and food industries.

**What has been done**

Methods developed to empirically assess the effect of market structure of productivity growth and the latter's effect on international trade in agricultural and food industries.

**Results**

In the competitive agriculture industry, we have and will continue to empirically quantify market failures in knowledge creation and the need for public R&D policies. In the concentrated food industries, we have worked to empirically identify the trade-off between industrial concentration and productivity. The latter component shows that the market power of a few food firms may be necessary to increase the industry's rate of productivity. For agricultural and food industries, it is well known that the level of productivity is an important determinant of international competitiveness. However, advances in transportation, communication and information technology along with multilateral liberalization have facilitated the transfer of technology across countries. We find that convergence improves U.S. consumers' terms of trade and welfare, but some processed food industries may be losing global market shares. We have also identified the separate sources of productivity growth in U.S. agricultural and processed food industries. We will continue to address the possible erosion of technological advantage in the context of increased global economic integration. The change in knowledge due to this project will have important policy implications.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
609	Economic Theory and Methods
606	International Trade and Development

**Outcome #2****1. Outcome Measures**

We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. - Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. - Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large. - Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
606	International Trade and Development

**Outcome #3****1. Outcome Measures**

The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). If productivity convergence is indeed rapid and unlimited, then policy makers should focus on instruments to alleviate painful adjustment likely in farm and rural communities. In addition, identifying beneficiaries and the extent of their gains allow for transferring some of the gains to affected communities.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
609	Economic Theory and Methods

**Outcome #4****1. Outcome Measures**

Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
606	International Trade and Development

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Before-After (before and after program)

**Evaluation Results**

**Key Items of Evaluation**

**Program #8**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Microbiology and a Healthy World

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management			1%	
135	Aquatic and Terrestrial Wildlife			10%	
136	Conservation of Biological Diversity			3%	
201	Plant Genome, Genetics, and Genetic Mechanisms			7%	
212	Pathogens and Nematodes Affecting Plants			20%	
311	Animal Diseases			19%	
313	Internal Parasites in Animals			22%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			11%	
723	Hazards to Human Health and Safety			7%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	3.7	0.0
<b>Actual</b>	0.0	0.0	3.9	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	56064	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	862545	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1574764	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Investigators in this program conducted studies to investigate the role of microbes in maintaining a healthy world in the following subprograms. 1. Human health: activities include development of an effective anti-poxvirus drug for use in treating or preventing human disease caused by pathogenic poxviruses and investigation on proteins involved in baculovirus DNA replication and structure. 2. Plant pathogens: activities include studying the roles of the untranslated regions (UTRs) of the genomic RNAs of the positive strand RNA viruses Turnip yellow mosaic virus (TYMV) and the mosquito-borne flaviviruses dengue virus and West Nile virus and development of an agrobacterium oncogene silencing strategy to produce plants resistant to crown gall. 3. In the food and water safety subprogram, research sought to characterize and evaluate the probiotic potential of exopolysaccharide (i.e. biopolymer) producing Lactic acid bacterial (LAB) strains. 4. Microbes and environmental health: The main focus is investigating the SAR11 clade, which will contribute to the health and productivity of the oceans. 5. Fish health: Investigators conducted extensive investigations on microbial pathogens of fishes.

**2. Brief description of the target audience**

- Salmonid industry
- iomedical researchers
- oceanographers
- climatographers
- agricultural producers
- virologists

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	600	2800	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	24	24

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	30

**Output #2****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF BACTERIA AND VIRUSES AND OTHER MICROORGANISMS – identify aspects of biology and biotechnology of viruses and bacteria that affect human health

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	3

**Output #3****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS – identify characteristics of food and water systems

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #4****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS – identify genetic mechanisms of plant pathogens – describe characteristics of and changes due to zebrafish and salmonid diseases

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #5****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH – identify marine microbial expressions of environmental health

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>UNDERSTAND ROLE OF PROTEINS AND MOLECULAR BIOLOGY TO MITIGATE DISEASE - Experiments will increase peer understanding of the structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - Experiments will increase peer understanding of the role a number of critical proteins play in baculovirus genome replication and processing. - understand the molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in <i>P. aeruginosa</i> group behavior and pathogenesis. - gain more detailed knowledge about the molecular biology of RNA viruses affecting crops, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - peers learn how the GALLS protein participates in gene transfer to plants and its role in plant transformation - researchers will assess chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - learn about new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA</p>
2	<p>Scientists learn to use SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.</p>
3	<p>Fish health managers and veterinarians gain information on host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.</p>
4	<p>Application of new assays and technology will help combat viruses - .assay development and biochemical details of proteolysis will support ongoing rational drug design and high throughput screening efforts designed to develop G1L inhibitors as potential antiviral drugs. - assist in the continued application of baculovirus technology to a variety of investigations that have become so dependent upon the use of this remarkable group of viruses. - information about molecular biology of RNA viruses could be used in designing new approaches for combating pathogenesis by these viruses.</p>
5	<p>the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle</p>



**Outcome #1****1. Outcome Measures**

UNDERSTAND ROLE OF PROTEINS AND MOLECULAR BIOLOGY TO MITIGATE DISEASE - Experiments will increase peer understanding of the structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - Experiments will increase peer understanding of the role a number of critical proteins play in baculovirus genome replication and processing. - understand the molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in *P. aeruginosa* group behavior and pathogenesis. - gain more detailed knowledge about the molecular biology of RNA viruses affecting crops, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - peers learn how the GALLS protein participates in gene transfer to plants and its role in plant transformation - researchers will assess chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - learn about new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

These studies are providing insights into gene expression by eukaryotic ribosomes, as well as explaining expression mechanisms used by positive strand RNA viruses. Crown gall is a problem world-wide and causes damage to commercial crops. Data demonstrates that the cell based biosensor has applications for the detection of bacterial pathogens and chemical toxicants in food products as well as in food production environments.

**What has been done**

Activities include studying the roles of the untranslated regions (UTRs) of the genomic RNAs of the positive strand RNA viruses Turnip yellow mosaic virus (TYMV) and the mosquito-borne flaviviruses dengue virus and West Nile virus and development of an agrobacterium oncogene silencing strategy to produce plants resistant to crown gall. In the food and water safety subprogram, research sought to characterize and evaluate the probiotic potential of exopolysaccharide (i.e. biopolymer) producing Lactic acid bacterial (LAB) strains.

**Results**

Studies on the translational expression of Turnip yellow mosaic virus have shown the ability of AUG initiation codons to be recognized in a simultaneous way by ribosomes. The team has coined this modality 'initiation coupling,' and expects it to be significant in the expression of non-viral eukaryotic mRNAs. Investigators developed a method to create apple and grape rootstocks resistant to crown gall. Investigators discovered a novel *Agrobacterium* virulence protein that transports foreign DNA into the nucleus of plant cells and functions more efficiently than alternative *Agrobacterium*-encoded nuclear import proteins. Data generated indicates that environmental conditions as well as a genetic orientation controls the synthesis and characteristics of lactococcal exopolysaccharides, thus impacting the probiotic potential of LAB strains. Research has led to the discovery of a bacterial polymer, composed of simple sugars and which thickens liquids. Mutational analysis provided genetic evidence for a model of exopolysaccharide gene organization and evolution in *Lactococcus*.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants
723	Hazards to Human Health and Safety
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #2****1. Outcome Measures**

Scientists learn to use SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Natural SAR11 populations may undergo transient periods where growth is limited by the availability of reduced sulfur, placing them at a competitive disadvantage alongside organisms that have the assimilatory sulfate reduction pathway.

**What has been done**

The main focus is investigating the SAR11 clade, which will contribute to the health and productivity of the oceans.

**Results**

Results show that SAR11 cells have a very unusual requirement for reduced sulfur compounds because they lack the metabolic pathway for assimilatory sulfate reduction.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
136	Conservation of Biological Diversity
112	Watershed Protection and Management

**Outcome #3****1. Outcome Measures**

Fish health managers and veterinarians gain information on host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Results have saved the state millions of dollars in clean-up funds. Biologists overseeing fish facilities can make appropriate decisions depending on which type of bacteria is present.

**What has been done**

Investigators conducted extensive investigations on microbial pathogens of fishes.

**Results**

Results show that skeletal deformities in fish in the Willamette River was caused by parasites, rather than pollutants. Findings show that trout from high mountain lakes have elevated concentrations of pollutants derived from air, which has profoundly changed the view of pristine lakes in the western U.S. Two PCR tests developed by the investigator are now routinely used by research labs. Studies of mycobacteria in fish have demonstrated differences in virulence between species and strains.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
311	Animal Diseases
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife
313	Internal Parasites in Animals
112	Watershed Protection and Management

**Outcome #4****1. Outcome Measures**

Application of new assays and technology will help combat viruses - .assay development and biochemical details of proteolysis will support ongoing rational drug design and high throughput screening efforts designed to develop G1L inhibitors as potential antiviral drugs. - assist in the continued application of baculovirus technology to a variety of investigations that have become so dependent upon the use of this remarkable group of viruses. - information about molecular biology of RNA viruses could be used in designing new approaches for combating pathogenesis by these viruses.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Smallpox virus is one of the most significant pathogenic threats. Baculoviruses are used as vectors for the production of proteins for biomedical research.

**What has been done**

Activities include development of an effective anti-poxvirus drug for use in treating or preventing human disease caused by pathogenic poxviruses and investigation on proteins involved in baculovirus DNA replication and structure.

**Results**

Research will develop anti-poxvirus drugs. Research provides fundamental data on how the virus can replicate its DNA and how it is able to recombine during the infection cycle, which is critical for understanding how the virus is able to function and for assessing its safety as an insecticide.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
311	Animal Diseases
723	Hazards to Human Health and Safety

**Outcome #5****1. Outcome Measures**

the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities

**Brief Explanation**

**V(l). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Before-After (before and after program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #9**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Consumers, Food Marketing, and Business Strategies

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
503	Quality Maintenance in Storing and Marketing Food Products			33%	
602	Business Management, Finance, and Taxation			34%	
603	Market Economics			11%	
606	International Trade and Development			11%	
607	Consumer Economics			11%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.0	0.0	5.0	0.0
<b>Actual</b>	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	18051	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	227722	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	18200	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.
- Conduct surveys, focus groups
  
- Conduct Workshops, meetings.
  
- Deliver Services.
  
- Develop Products, Curriculum, Resources.
  
- Provide Training.
  
- Provide Counseling.
  
- Assessments.
  
- Work with Media.
  
- Partnering.
  
- Facilitating.

**2. Brief description of the target audience**

Small- to medium-sized food processors  
 New enterprises  
 Government officials  
 consumers

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	120	100	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

**Year Target**

Plan: 0

2007 : {No Data Entered}

**Patents listed**

{No Data Entered}

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
<b>Plan</b>			
2007	{No Data Entered}	{No Data Entered}	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	27	0

**Output #2****Output Measure**

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - identify demand and firm strategies

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	0

**Output #3****Output Measure**

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCES - research and extension activities integration between food scientists and business strategists

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	0



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<ul style="list-style-type: none"> <li>• Improved understanding of market conditions and knowledge to determine business choices.</li> <li>• Expanded knowledge base of factors important to distinguish different types of consumers and their food choices in the Portland metropolitan area.</li> <li>• The development of a process map for food business development and planning.</li> <li>• Training of nascent and existing food entrepreneurs in food business management.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Expansion of information and basis for consumer food choice factors to regions beyond Portland metropolitan area. Provide a valid measure for comparing consumer populations and subpopulations food choice habits for use by northwest food processors and producers to help them establish target markets.</li> </ul>
3	<p>Assist new and existing businesses expand: Enable decision-making regarding choice of marketing practices by food marketers and producers, policy decisions by government officials that affect businesses in the food industry. Save explorers many thousands of dollars, as well as energy and emotional stress by helping them realize early that starting a food business isn't what they need to do. Assist approximately 3-5 companies start their food business through one-on-one counseling and market research. Help 3-5 companies turn their business around and start growing.</p>
4	<p>Improve competitiveness of Pacific Northwest food businesses.</p> <ul style="list-style-type: none"> <li>• Increased business activity and success in the Northwest food industries.</li> <li>• Sustainable competitive advantage for Northwest food industries that are able to accurately gage consumer demand for their products. Improve the food economy by developing new, stronger, and growing food businesses in the state. Help reduce the state's unemployment through the creation of jobs in these food companies.</li> </ul>

**Outcome #1****1. Outcome Measures**

- Improved understanding of market conditions and knowledge to determine business choices.
- Expanded knowledge base of factors important to distinguish different types of consumers and their food choices in the Portland metropolitan area.
- The development of a process map for food business development and planning.
- Training of nascent and existing food entrepreneurs in food business management.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
603	Market Economics
602	Business Management, Finance, and Taxation
607	Consumer Economics

**Outcome #2****1. Outcome Measures**

- Expansion of information and basis for consumer food choice factors to regions beyond Portland metropolitan area. Provide a valid measure for comparing consumer populations and subpopulations food choice habits for use by northwest food processors and producers to help them establish target markets.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
607	Consumer Economics
603	Market Economics
602	Business Management, Finance, and Taxation

**Outcome #3****1. Outcome Measures**

Assist new and existing businesses expand: Enable decision-making regarding choice of marketing practices by food marketers and producers, policy decisions by government officials that affect businesses in the food industry. Save explorers many thousands of dollars, as well as energy and emotional stress by helping them realize early that starting a food business isn't what they need to do. Assist approximately 3-5 companies start their food business through one-on-one counseling and market research. Help 3-5 companies turn their business around and start growing.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation
603	Market Economics
607	Consumer Economics

**Outcome #4****1. Outcome Measures**

Improve competitiveness of Pacific Northwest food businesses.

- Increased business activity and success in the Northwest food industries.
- Sustainable competitive advantage for Northwest food industries that are able to accurately gauge consumer demand for their products. Improve the food economy by developing new, stronger, and growing food businesses in the state. Help reduce the state's unemployment through the creation of jobs in these food companies.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
603	Market Economics
607	Consumer Economics
602	Business Management, Finance, and Taxation

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)
- Other (experiences of participants)

**Brief Explanation**

{No Data Entered}

**V(l). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Time series (multiple points before and after program)
- Case Study
- Other (peer review process)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #10****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Animal and Human Health and Well Being through Nutrition

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
308	Improved Animal Products (Before Harvest)	30%		30%	
311	Animal Diseases	20%		20%	
315	Animal Welfare/Well-Being and Protection	50%		50%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	1.0	0.0
<b>Actual</b>	0.1	0.0	0.6	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	9078	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	139672	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	129160	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The poultry subprogram conducted experiments to investigate the effect of hen age and dietary bioactive lipids on egg quality, yolk content, and hatchability. Maternal hen and chick diets with different bioactive lipids were formulated and several analytical aspects such as egg tocopherol, egg and tissue fatty acids, production of eicosanoids, and the status of antioxidant enzymes in the chicks' tissues were assayed. The lead PI taught and mentored graduate students and demonstrated techniques to three visiting scientists. Research findings were disseminated through publications, symposia and at the Poultry science annual meeting and a seminar was given at the Avian Health Institute.

**2. Brief description of the target audience**

The target audiences are scientific peers in the United States and World, Extension personnel, nutritional consultants and ultimately dairy, livestock and poultry producers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	25	0	0	0
2007	1200	5500	100	400

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	8	8

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS – carry out experiments to test the effects of a natural product (OmniGen-AF) on the development of J5 titer following vaccination with aPfizer J5 E. coli vaccine.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	0

**Output #2**

**Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - reduce percentage of mortality to enhance hatchability in poultry – carry out tests to identify a marker of immunity in livestock

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	1

**Output #3**

**Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH - increase percentage of n-3 fatty acids and CLA in poultry foods to enhance availability of these health-enhancing nutrients to consumers and lead to novel product development and increased marketability of poultry products.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	1

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	Improved Animal Health - peers are provided new knowledge about the fundamental relationship between maternal diet, fatty acid metabolism and egg hatchability. - producers learn of a technological strategy to enhance the efficacy of their vaccination programs in livestock (available by 2008 or 2009) and of a diagnostic method which will assess immune health of their livestock (available in 2009n or 2010).
2	Improved productivity - poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals
3	Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry. Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production.



**Outcome #1****1. Outcome Measures**

Improved Animal Health - peers are provided new knowledge about the fundamental relationship between maternal diet, fatty acid metabolism and egg hatchability. - producers learn of a technological strategy to enhance the efficacy of their vaccination programs in livestock (available by 2008 or 2009) and of a diagnostic method which will assess immune health of their livestock (available in 2009n or 2010).

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

poultry producers

**What has been done**

Maternal hen and chick diets with different bioactive lipids were formulated and several analytical aspects such as egg tocopherol, egg and tissue fatty acids, production of eicosanoids, and the status of antioxidant enzymes in the chicks' tissues were assayed.

**Results**

Preliminary research has shown that availability of maternal dietary n-3 fatty acids is likely to be crucial during the pre- and post-hatch period in broiler chickens in order to increase retention of n-3 fatty acids in the chick tissues and may help modulate inflammation in the progeny chicks. Decreasing proinflammatory eicosanoid generation through maternal dietary manipulation could lead to fewer inflammatory disorders and metabolic diseases and may decrease the mortality rate of chicks during the first two weeks of life, which continues to be a problem for the broiler industry.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)

**Outcome #2****1. Outcome Measures**

Improved productivity - poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
311	Animal Diseases
308	Improved Animal Products (Before Harvest)

**Outcome #3****1. Outcome Measures**

Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry. Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
311	Animal Diseases
308	Improved Animal Products (Before Harvest)

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Retrospective (post program)
- Other (peer review process)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #11****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Reproductive Performance of Animals

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals			95%	
304	Animal Genome			5%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	1.2	0.0
<b>Actual</b>	0.0	0.0	0.5	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	75661	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	293665	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	345471	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The bovine uterine health subprogram investigator is conducting an experiment to determine whether a hormonal treatment regimen used to synchronize estrus in beef heifers alters the function of the developing corpus luteum. The male fitness in poultry investigator has used a proteomics approach to identify key proteins that affect sperm cell function, specifically, proteins affecting intracellular calcium homeostasis will be investigated. Proteins extracted from sperm will be separated by electrophoresis and western blotting will be used to determine calreticulin content. This investigator has developed an experimental model, which is under review at this institution's Office of Technology Transfer. Results for the program have been disseminated through annual meetings and publications.

**2. Brief description of the target audience**

Target audiences are scientists working in reproductive physiology, Extension personnel, genetic companies in all species and Oregon producers, poultry breeders.

**V(E). Planned Program (Outputs)****1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	100	300	0	0
2007	75	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)****Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	2	2

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS - Inform peers of factors affecting differentiation and outgrowth of endodermal cells from the bovine inner cell mass during the formation of extraembryonic endoderm. (Menino) - inform peers of the relationship and interactions between the immune and reproductive systems with regard to establishment and maintenance of pregnancy. (Cannon) - conduct experiments on physiological constraints limiting gamete viability (Froman) 1/yr

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	1

**Output #2****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - describe effects of the reproductive hormones on gene expression and cell function - Know expression patterns and identity of cells expressing suppressors of cytokine signaling genes, and how these genes are regulated in reproductive tissues

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	3

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Knowledge gained regarding reproductive biology - Peers gain new information regarding the developmental biology of the early bovine embryo and factors affecting establishment of extraembryonic endoderm - Peers and producers learn new means to improve fertility in dairy cattle and to reduce uterine infections - Peers gain detailed knowledge of sperm cell function and a conceptual basis for understanding a genetic basis for fertility in male poultry
2	Improved fertility and genetic stock - Producers and animal health professionals use information to improve fertility and prevent uterine infections in dairy cattle into every-day on-farm practices. - Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock
3	Reduced costs and economic benefits achieved - Costs associated with uterine disease and infertility in the dairy industry are reduced - A method for cryopreservation of poultry semen enables an emergence of frozen poultry semen as a commodity, and it changes the way in which commercial breeders of poultry conduct their business, i.e., through reproductive management of male stock, selection schemes, retention of traits in the form of cryopreserved semen, and the emergence of cryopreserved poultry semen as a commodity - A collateral effect will be improved semen preservation in vertebrates in general.

**Outcome #1****1. Outcome Measures**

Knowledge gained regarding reproductive biology - Peers gain new information regarding the developmental biology of the early bovine embryo and factors affecting establishment of extraembryonic endoderm - Peers and producers learn new means to improve fertility in dairy cattle and to reduce uterine infections - Peers gain detailed knowledge of sperm cell function and a conceptual basis for understanding a genetic basis for fertility in male poultry

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

livestock and poultry producers

**What has been done**

investigator is conducting an experiment to determine whether a hormonal treatment regimen used to synchronize estrus in beef heifers alters the function of the developing corpus luteum. The male fitness in poultry investigator has used a proteomics approach to identify key proteins that affect sperm cell function.

**Results**

In the bovine uterine health subprogram, preliminary research may demonstrate that the current estrous synchronization treatment regimen used on beef heifers may actually compromise the function of the developing corpus luteum. In the male fitness in poultry subprogram, preliminary data suggest calreticulin may be a protein of interest.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
301	Reproductive Performance of Animals

**Outcome #2****1. Outcome Measures**

Improved fertility and genetic stock - Producers and animal health professionals use information to improve fertility and prevent uterine infections in dairy cattle into every-day on-farm practices. - Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

livestock and poultry producers

**What has been done**

Proteins extracted from sperm will be separated by electrophoresis and weatern blotting will be used to determine calreticulin content.

**Results**

Ongoing research seeks to identify specific genes of this protein, which will thus provide breeders a knowledge base of animal performance at the cellular level. The investigator has also created an experimental model for artificial semen preservation in the U.S. poultry industry.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
304	Animal Genome

**Outcome #3****1. Outcome Measures**

Reduced costs and economic benefits achieved - Costs associated with uterine disease and infertility in the dairy industry are reduced - A method for cryopreservation of poultry semen enables an emergence of frozen poultry semen as a commodity, and it changes the way in which commercial breeders of poultry conduct their business, i.e., through reproductive management of male stock, selection schemes, retention of traits in the form of cryopreserved semen, and the emergence of cryopreserved poultry semen as a commodity - A collateral effect will be improved semen preservation in vertebrates in general.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

poultry producers

**What has been done**

This investigator has developed an experimental model.

**Results**

The investigator has created an experimental model for artificial semen preservation in the U.S. poultry industry.



**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
304	Animal Genome

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Government Regulations

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #12**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Sustainable Animal Production Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.0	0.0	1.6	0.0
<b>Actual</b>	0.6	0.0	0.5	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	20940	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	322161	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	65583	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

This program is designed to look at sustainable production systems for sheep, beef and dairy, and poultry. Investigators in the sheep breeding program are examining genetic and management factors that influence embryonic and pre-natal loss of potential lambs in commercial ewes. The goal is to develop a reduced input sheep production system focused on spring pasture lambing with minimal labor requirements. Investigators are currently working to identify and evaluate ewe genotypes suitable for such a management system and to determine timing of lambing and other relevant parameters to make such a system feasible. Trial results have been disseminated through presentations at regional research meetings, local extension meetings, and annual meetings of the Oregon Sheepgrowers Association. Investigators in the beef and dairy subprogram are evaluating and developing efficient animal, manure and cropping systems for reduced nutrient flow, cycling, transformation and loss to the environment. Investigator is currently working to refine, evaluate and apply integrated quantitative models of dairy and beef farms, including organic livestock production, to predict profitability and nutrient losses to the environment. He is also working on water quality and on-farm energy development issues. Activities related to water quality include manure, pesticide control, nutrient outflow, sedimentation, and temperature degradation management. Investigator is working with local livestock producers to explore the feasibility of biogas production for on-farm electrical generation. He has developed a model budget and plans to install an anaerobic digester. Outputs include development of science-based tools, educational materials and websites, and presentations at national and regional meetings. Investigators in the poultry breeding subprogram have initiated a genetic selection study to determine the mode of transmission of genes responsible for embryonic mortality, hatchability and subsequent chick performance.

## 2. Brief description of the target audience

- scientific peers in the United States and World,
- Extension personnel and other educators
- nutritional consultants and ultimately
- dairy, livestock and poultry producers
- policy makers, regulators, politicians
- commodity groups

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	2350	4300	100	100
2007	485	935	40	118

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	11	2	13

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - improved, surviving offspring and appropriate calving dates (cows – 40x4) - improved weaned weight (lamb - 6lb per ½ condition score) - reduced lambing production inputs (remove those of high mortality risk) - more economical and environmentally sustainable dairy and beef production systems that meet new environmental requirements - synchronizing forage and carcass data for calf and cow management

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	9

**Output #2****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMAL - identify previously unknown gene (1/yr) – Savage To acquire a more thorough understanding of the genetic load that is present in economically significant populations of poultry based upon the identification of embryonic failures that are present in Coturnix quail.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	4

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Information regarding genetic influences - Poultry breeders gain information regarding genetic causes of early embryonic failures (Savage) - Producers are aware of sire genotype effects on embryonic loss and of management factors that influence loss of potential lambs in commercial ewes, such as body condition at lambing positively correlated with total weight of lamb weaned (Meyer)
2	Information regarding forage and nutrient management - Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. (Gamroth) - Information will aid Extension Specialists in producing extension workshops and other forms of teaching or consulting with farmers on issues related to grazing, manure management, and cropping systems. - Beef industry will understand forage quality dynamics for dominant forage species in Oregon, how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.
3	Improved genetic stocks: - Knowing genetic causes of early embryonic failures allows poultry breeders to remove deleterious genes from their breeding populations. (Savage) - Understanding ramifications of sire effects, in the short term producers are starting to pursue alternative terminal sires such as the Texel x Suffolk. A program is initiated to develop a composite sire breed as an alternative.
4	Better nutrition strategies applied - Producers will adopt critical post-mating nutrition through the time of embryonic attachment to the placenta, having learned that body condition at lambing is positively correlated with total weight of lamb weaned - Farmers will more strategically plan for crop production and manure management.
5	Increased productivity achieved: - Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has improved resource and economic sustainability through reduced costs and/or increased productivity. - Producers use critical post-mating nutrition to produce about 6 pounds of additional weaning weight per ½ condition score. Also, intense selection reduces needs for assistance in pasture lambing conditions. - Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production.

**Outcome #1****1. Outcome Measures**

Information regarding genetic influences - Poultry breeders gain information regarding genetic causes of early embryonic failures (Savage) - Producers are aware of sire genotype effects on embryonic loss and of management factors that influence loss of potential lambs in commercial ewes, such as body condition at lambing positively correlated with total weight of lamb weaned (Meyer)

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	2

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

poultry and sheep breeders

**What has been done**

Investigators are currently working to identify and evaluate ewe genotypes and to determine timing of lambing and other relevant parameters.

**Results**

Investigators in the sheep breeding program continue to amass genetic data into a database, recording maternal and fetal effects on embryonic loss. Investigators in the poultry breeding subprogram have identified two previously unknown embryonic failures of genetic origins. These findings contribute to the limited knowledge base of genes that reduce the hatchability of fertile eggs.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**Outcome #2****1. Outcome Measures**

Information regarding forage and nutrient management - Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. (Gamroth) - Information will aid Extension Specialists in producing extension workshops and other forms of teaching or consulting with farmers on issues related to grazing, manure management, and cropping systems. - Beef industry will understand forage quality dynamics for dominant forage species in Oregon, how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**Outcome #3****1. Outcome Measures**

Improved genetic stocks: - Knowing genetic causes of early embryonic failures allows poultry breeders to remove deleterious genes from their breeding populations. (Savage) - Understanding ramifications of sire effects, in the short term producers are starting to pursue alternative terminal sires such as the Texel x Suffolk. A program is initiated to develop a composite sire breed as an alternative.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**Outcome #4**

**1. Outcome Measures**

Better nutrition strategies applied - Producers will adopt critical post-mating nutrition through the time of embryonic attachment to the placenta, having learned that body condition at lambing is positively correlated with total weight of lamb weaned - Farmers will more strategically plan for crop production and manure management.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**Outcome #5****1. Outcome Measures**

Increased productivity achieved: - Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has mproved resource and economic sustainability through reduced costs and/or increased productivity. - Producers use critical post-mating nutrition to produce about 6 pounds of additional weaning weight per ½ condition score. Also, intense selection reduces needs for assistance in pasture lambing conditions. - Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement**



**Issue (Who cares and Why)**

poultry breeders

**What has been done**

Investigators in the poultry breeding subprogram have identified two previously unknown embryonic failures of genetic origins.

**Results**

The awareness of these genes will allow poultry breeders the knowledge necessary to remove these harmful genes from populations of economically important poultry, subsequently improving bird performance at lowered costs of production.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
307	Animal Management Systems

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Public Policy changes
- Government Regulations

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Retrospective (post program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #13****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Alternative Energy Systems and Bioproducts

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes			100%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	5.1	0.0
<b>Actual</b>	0.0	0.0	2.3	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	22113	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	340205	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	266262	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The program goals are biological engineering for the production of alternative energy and bioproducts. Investigators in this program have worked to develop a microbial fuel cell that can use wastewater and sewage to generate electricity; conduct research to allow the production of hydrogen for fuel cells by microorganisms that use solar energy to split water; and find an efficient method of producing bioenergy from mass-produced algae. Results have been disseminated through journal publications, presentations, interviews and articles.

**2. Brief description of the target audience**

The target audiences for this research are potential producers and industrial manufacturers of hydrogen and bio-diesel.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	600	6000	60	60
2007	200	6000	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	3

**Patents listed**

- 1.(Provisional) Nanoenhanced Microbial Fuel Cells for Power Generation and Microscale Device and Nanoelectronic Applications (2007) Chaplen, F, Liu, H, Jiao, J. Fern, A. (Inventors).
- 2.(Provisional) Enhanced Coulombic Efficiency and Power Density of Air-Cathode Microbial Fuel Cells (MFCs) with Cloth Electrode Assemblies (2007) Liu, H; Fan, Y. (Inventors)
- 3(Provisional) Microbial Fuel Cells Using bicarbonate as buffer. (2008) Liu, H; Fan, Y. (Inventors)

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	9	9

**Output #2**

**Output Measure**

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS – boost solar energy capture for hydrogen production through development of a variety of feedstocks – improved microbial feedstocks for biodiesel production

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	3

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Improved knowledge about feedstocks for biofuels and bioenergy: - Researchers learn new methods of metabolic engineering for photobiological H <sub>2</sub> production on a 24-hour basis - Energy sector will learn that the electrical energy required with the photobiological approach could be much lower than the typical energy requirement of hydrogen produced by water electrolysis. - Growers learn to produce algae as a biofuel feedstock
2	Applications will advance production systems for bioenergy: - Peers develop biomimetic models to create biobased generators to produce molecular H <sub>2</sub> and O <sub>2</sub> from water and light, and these generators are incorporated into integrated H <sub>2</sub> energy systems, providing generation, storage, and utilization of H <sub>2</sub> in one unit. - Energy producers optimize the photobiological process to yield higher energy efficiencies. - Construction and operation of bioenergy facilities close to potential feedstocks will generate additional economic activity in rural areas. - If waste biomass, such as animal wastes and organic component of urban wastewater is used as feedstocks, not only biohydrogen can be harvested, but also the wastes can be treated. - Algae can produce 30 times more oil per unit area of land than terrestrial oilseed crops

**Outcome #1****1. Outcome Measures**

Improved knowledge about feedstocks for biofuels and bioenergy: -  
 Researchers learn new methods of metabolic engineering for photobiological H<sub>2</sub> production on a 24-hour basis - Energy sector will learn that the electrical energy required with the photobiological approach could be much lower than the typical energy requirement of hydrogen produced by water electrolysis. -  
 Growers learn to produce algae as a biofuel feedstock

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

energy producers and consumers

**What has been done**

Investigators conducted research to allow the production of hydrogen for fuel cells by microorganisms that use solar energy to split water and bioenergy from mass-produced algae.

**Results**

This program is improving the biological production of biofuels and hydrogen from alternate energy systems.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

**Outcome #2****1. Outcome Measures**

Applications will advance production systems for bioenergy: - Peers develop biomimetic models to create biobased generators to produce molecular H<sub>2</sub> and O<sub>2</sub> from water and light, and these generators are incorporated into integrated H<sub>2</sub> energy systems, providing generation, storage, and utilization of H<sub>2</sub> in one unit. - Energy producers optimize the photobiological process to yield higher energy efficiencies. - Construction and operation of bioenergy facilities close to potential feedstocks will generate additional economic activity in rural areas. - If waste biomass, such as animal wastes and organic component of urban wastewater is used as feedstocks, not only biohydrogen can be harvested, but also the wastes can be treated. - Algae can produce 30 times more oil per unit area of land than terrestrial oilseed crops

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #14**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Managing Marine Resources for Sustainable Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife			56%	
302	Nutrient Utilization in Animals			8%	
303	Genetic Improvement of Animals			10%	
311	Animal Diseases			2%	
604	Marketing and Distribution Practices			1%	
605	Natural Resource and Environmental Economics			23%	
<b>Total</b>				100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	8.5	0.0
<b>Actual</b>	0.0	0.0	2.8	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	55110	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	847872	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2338233	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

This program will conduct research to understand, utilize and sustain marine resources and coastal ecosystems. In particular, this program will focus its strategic goals and initiatives on managing natural resources that contribute to Oregon's quality of life, and growing and sustaining natural resources-based industries such as fisheries, seafood processing, and oyster aquaculture; and optimizing enterprise, innovation, and economic development. Investigators in the marine resources subprogram have conducted research on general fishery policy and fishery management reform, as well as on the design of incentive-based fishery management tools for marine protected areas and ecosystem-based management. Investigator conducted additional activities to support the general objectives of a public and fishery management community better informed about economic issues and the potential for management reform. Other research seeks to improve the quality, accuracy, and understanding of the stock assessment results and harvest management procedures that are used in the management of Oregon's fisheries for groundfish so that these fisheries can achieve greater economic benefits. Investigators in the seafood marketing management subprogram developed a digital based datalogger and traceability system that is now being tested for broader use in the Oregon and West Coast seafood industry and a website that integrates digital seafood and fisheries information for use by the Oregon seafood industry and other sectors. The aquaculture subprogram is focused on oyster breeding. The pacific oyster breeding program has planted cohorts, each consisting of 50 to 60 families, are planted at two or more West coast test-sites. Top performing families (highest yields) are identified and the top third largest individual oysters are selected from each top family for use as broodstock to produce the next generation. Pedigrees of broodstock are verified by microsatellite analysis. A rotational breeding program has been implemented to avoid inbreeding effects. In addition, investigators have begun to develop approaches to select for desirable shell shape as well as both shell and mantle color for the half-shell oyster market. Investigators in the living marine resources subprogram have developed molecular resources for population characterization, statistical and computer applications to determine which combinations of these molecular markers provide greater power for population discrimination, and the training of new professionals in the area of marine fisheries genetics. Specifically, this investigator has developed over 30 novel molecular markers; three computer applications; characterized structure among population assemblages of a variety of species. The subprogram has also developed a method to determine river basin of origin for salmonids and next will learn how the distribution of fish is related to oceanographic data. Results have been published in peer-reviewed articles, presented at national meetings and workshops.

**2. Brief description of the target audience**

fishing industry and managers, coastal communities and leaders, peers, extension educators, economists, aquaculture producers, food safety agencies and seafood producers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	770	22500	170	2000
2007	130	230	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	12	12



**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS – use emerging statistical and molecular genetic techniques to determine distinctions among alternate life history strategies and separate breeding units among fishery components, particularly in salmon, groundfish, and oysters. (Banks) – develop selective breeding program, repository, and resource center for various desirable traits of Pacific oysters (Langdon)

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #2****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS– complete and apply stochastic and deterministic models for fish disease life cycles (Reno)

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	2	0

**Output #3****Output Measure**

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTION – provide fishery scientists and the fishing industry with information on how stock assessments to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry (Sampson) – publications and educational materials and programs describing drivers of fishing change plus incentive-based and other management tools, their applicability to Oregon fishery problems and fishing community sustainability (Hanna) – produce economic and market information to improve fisheries management and marketing in Oregon and the Pacific Northwest (Sylvia) and PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	7	5

**Output #4****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS – develop microparticulate diets for marine fish larvae(Langdon)

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #5****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	12	30

**Output #6****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY – compare information gained through life history information synthesis, molecular genetic laboratory analyses, otolith elemental and isotopic analyses to evaluate fish life history variations and migration behaviors (Miller) – characterize for marine resource managers seasonal distributions of endangered great whales and characterize their year-round critical habitats (Mate)

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	8	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Knowledge generated regarding marine fisheries and their management:</p> <ul style="list-style-type: none"> <li>• Fisheries managers and researchers are informed of critical life history and migratory issues, i.e., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring</li> <li>• Informed managers and industry about how stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry</li> <li>• Managers are more aware about incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management.</li> <li>• Knowledge and awareness increased of traceability and case studies for seafood industry and educators.</li> <li>• Educate the shrimp industry and resource managers on new approaches for managing the fishery to increase economic benefits. Educate stakeholders and managers on using market-based tools for managing the environmental impacts of fishing</li> </ul>
2	<ul style="list-style-type: none"> <li>• Discuss with aquaculture feed companies the performance of complex microparticle types that provide nutrients to marine larval fish</li> </ul>
3	<ul style="list-style-type: none"> <li>• Understanding of the process of pathogen dispersal.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Provide peers and students with information on location and migration patterns of whales</li> </ul>
5	<p>Improved fisheries management: Fisheries managers and researchers use information to establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish. Resource managers, industries, and agencies can effect better conservation practices, reduce mortalities, and promote population recovery of whales Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. Oregon and Pacific Northwest industries will adopt traceability systems for marketing and science research (electronic logbooks). Case studies will be used to teach industry, managers, and students principles of seafood marketing and trade. Policy makers and fishery managers will adopt new approaches for managing the pink shrimp fishery and the environmental effects of fishing. Alter fisheries management strategies to encompass detailed knowledge of the dispersal/disease process</p>
6	<p>Improve nutrition of early larval stages of marine fish with microparticle feeds</p>
7	<p>Contributions are made toward ecosystem-based fisheries management and habitat restoration efforts for Pacific fish, shellfish and whales. Enhanced fish, shellfish, and whale populations will be of economic value in tourism, to restore health and stability to marine food webs, and to achieve a more enlightened populace with regard to the value of habitats and conservation.</p> <ul style="list-style-type: none"> <li>• Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry.</li> <li>• Traceability will increase marketing success and generate higher exvessel prices and profits for fishermen, processors, and retailers. Traceability will also be used to collect science information to improve science and management. Case studies will improve the success of seafood marketing, improve fishery management, and generate greater industry profit and social and economic benefits.</li> <li>• There will be an increase in economic and social benefits through the improved management of Oregon's pink shrimp fishery. The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems.</li> <li>• Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish.</li> <li>• The Pacific oyster breeding program will provide significant benefits to this \$3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding.</li> <li>• Reduce impact of disease on wild and cultured salmonids</li> </ul>



**Outcome #1****1. Outcome Measures**

Knowledge generated regarding marine fisheries and their management:

- Fisheries managers and researchers are informed of critical life history and migratory issues, i.e., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring
- Informed managers and industry about how stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry
- Managers are more aware about incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management.
- Knowledge and awareness increased of traceability and case studies for seafood industry and educators.
- Educate the shrimp industry and resource managers on new approaches for managing the fishery to increase economic benefits. Educate stakeholders and managers on using market-based tools for managing the environmental impacts of fishing

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	50

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Oregon and Pacific Northwest marine industries and coastal communities face significant challenges in balancing utilization and sustainability of marine resources. Many fishery resource stocks have reached natural biological limits or have been declared over-fished. A number of fisheries are overcapitalized and undergoing 'rationalization' in order to improve management and balance resource use with natural productivity.

**What has been done**

Investigators in the marine resources subprogram have conducted research on general fishery policy and fishery management reform, as well as on the design of incentive-based fishery management tools for marine protected areas and ecosystem-based management. Investigator conducted additional activities to support the general objectives of a public and fishery management community better informed about economic issues and the potential for management reform. Other research seeks to improve the quality, accuracy, and understanding of the stock assessment results and harvest management procedures that are used in the management of Oregon's fisheries for groundfish so that these fisheries can achieve greater economic benefits. Investigators in the seafood marketing management subprogram developed a digital based datalogger and traceability system that is now being tested for broader use in the Oregon and West Coast seafood industry and a website that integrates digital seafood and fisheries information for use by the Oregon seafood industry and other sectors. The aquaculture subprogram is focused on oyster breeding. The pacific oyster breeding program has planted cohorts, each consisting of 50 to 60 families, are planted at two or more West coast test-sites. Top performing families (highest yields) are identified and the top third largest individual oysters are selected from each top family for use as broodstock to produce the next generation. Pedigrees of broodstock are verified by microsatellite analysis. A rotational breeding program has been implemented to avoid inbreeding effects. In addition, investigators have begun to develop approaches to select for desirable shell shape as well as both shell and mantle color for the half-shell oyster market. Investigators in the living marine resources subprogram have developed molecular resources for population characterization, statistical and computer applications to determine which combinations of these molecular markers provide greater power for population discrimination, and the training of new professionals in the area of marine fisheries genetics. Specifically, this investigator has developed over 30 novel molecular markers; three computer applications; characterized structure among population assemblages of a variety of species. The subprogram has also developed a method to determine river basin of origin for salmonids and next will learn how the distribution of fish is related to oceanographic data.

### Results

The marine resources subprogram has demonstrated that there is growing interest in the potential application of market-based limited access privilege programs and other sustainable programs to a broader set of fishery interests, including fishery associations, fishing communities and the recreational sector. Analysis of policy recommendations for fishery management and of the science supporting marine protected areas is providing information for more effective fishery management decisions. Research into the design of economic tools for ecosystem-based fishery management is promoting fishery management more compatible with the economic incentives of fishery participants. Commercial oyster hatcheries have used pacific oyster broodstock, developed by the aquaculture subprogram, to produce large numbers of seed for the West Coast industry and foreign markets. Results in the living marine resources subprogram have successfully applied the computer modeling tool to resolve conflicts between fishery, management and conservation interests. Fishery management agencies have demonstrated strong interest in applying improved understanding of the relation between stock distribution and environmental conditions to avoid shutting down entire regions to protect a single run of fish.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals
135	Aquatic and Terrestrial Wildlife
311	Animal Diseases
604	Marketing and Distribution Practices

#### Outcome #2

##### 1. Outcome Measures

- Discuss with aquaculture feed companies the performance of complex microparticle types that provide nutrients to marine larval fish

##### 2. Associated Institution Types

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

**Outcome #3****1. Outcome Measures**

- Understanding of the process of pathogen dispersal.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
311	Animal Diseases

**Outcome #4****1. Outcome Measures**

- Provide peers and students with information on location and migration patterns of whales

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

**Outcome #5****1. Outcome Measures**

Improved fisheries management: Fisheries managers and researchers use information to establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish. Resource managers, industries, and agencies can effect better conservation practices, reduce mortalities, and promote population recovery of whales. Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. Oregon and Pacific Northwest industries will adopt traceability systems for marketing and science research (electronic logbooks). Case studies will be used to teach industry, managers, and students principles of seafood marketing and trade. Policy makers and fishery managers will adopt new approaches for managing the pink shrimp fishery and the environmental effects of fishing. Alter fisheries management strategies to encompass detailed knowledge of the dispersal/disease process

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

**Outcome #6**

**1. Outcome Measures**

Improve nutrition of early larval stages of marine fish with microparticle feeds

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

**Outcome #7**

**1. Outcome Measures**



Contributions are made toward ecosystem-based fisheries management and habitat restoration efforts for Pacific fish, shellfish and whales. Enhanced fish, shellfish, and whale populations will be of economic value in tourism, to restore health and stability to marine food webs, and to achieve a more enlightened populace with regard to the value of habitats and conservation.

- Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry.
- Traceability will increase marketing success and generate higher exvessel prices and profits for fishermen, processors, and retailers. Traceability will also be used to collect science information to improve science and management. Case studies will improve the success of seafood marketing, improve fishery management, and generate greater industry profit and social and economic benefits.
- There will be an increase in economic and social benefits through the improved management of Oregon's pink shrimp fishery. The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems.
- Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish.
- The Pacific oyster breeding program will provide significant benefits to this \$3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding.
- Reduce impact of disease on wild and cultured salmonids

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
605	Natural Resource and Environmental Economics
135	Aquatic and Terrestrial Wildlife
303	Genetic Improvement of Animals
604	Marketing and Distribution Practices

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Other (peer review process)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #15****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Conservation and Restoration of Aquatic, Marine and Terrestrial Ecosystems

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management			10%	
135	Aquatic and Terrestrial Wildlife			60%	
136	Conservation of Biological Diversity			30%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.6	0.0	4.5	0.0
<b>Actual</b>	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

•Conducting field and laboratory experiments and data collection. •Developing individual and community models of terrestrial and aquatic systems. •Developing curricular materials. •Developing monitoring protocols. •Presenting seminars and professional talks. •Conducting workshops and training sessions. •Publishing scientific findings.

**2. Brief description of the target audience**

The proposed program has numerous target audiences:

•Natural resources policy makers •State, federal, private, and nonprofit organization natural resources managers  
•University, state, federal and industry scientists •Watershed councils •Community leaders •Environmental educators  
•Natural resource users •Urban and rural citizens

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	3000	5000	500	2000
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

**Year    Target**

**Plan:**    0

2007 :    {No Data Entered}

**Patents listed**

{No Data Entered}

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	{No Data Entered}	{No Data Entered}	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	45	0

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	Approximately 8,000 adults and 2,500 youth per year will have increased awareness and knowledge of ecosystem processes and functions and methods for restoring degraded habitats.
2	As a result of this program individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration.
3	Changes in policies will result in sustainable natural resources use or restoration of ecosystems with positive impacts on social, economic, and environmental conditions.

**Outcome #1****1. Outcome Measures**

Approximately 8,000 adults and 2,500 youth per year will have increased awareness and knowledge of ecosystem processes and functions and methods for restoring degraded habitats.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
136	Conservation of Biological Diversity
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

**Outcome #2****1. Outcome Measures**

As a result of this program individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

**Outcome #3****1. Outcome Measures**

Changes in policies will result in sustainable natural resources use or restoration of ecosystems with positive impacts on social, economic, and environmental conditions.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

{No Data Entered}

**V(l). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}



**Program #16****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Plant and Soil Management in Agricultural Systems

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	57%		57%	
205	Plant Management Systems	18%		18%	
511	New and Improved Non-Food Products and Processes	25%		25%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	6.0	0.0	2.9	0.0
<b>Actual</b>	0.3	0.0	1.2	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	155363	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1255257	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	669175	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

Program participants are working to develop and apply the best tools of contemporary plant and soil sciences to address the challenges and opportunities facing the agricultural industry and natural resource communities of Oregon through field and laboratory research. Investigators in the nutrient management subprogram developed guidance for land application of byproducts, and produced a calibrated soil test that accurately predicts spring fertilizer rate, analyzed plant nutrient tissue and uptake to determine the levels of potassium and sulfur fertilization effect on yield, quality and nutrient uptake of plants. Investigators in the plant management subprogram conducted field trials to develop new alfalfa species and varieties adapted to Central Oregon. On-farm trials were used extensively to assist grass seed growers in developing economically and environmentally responsible spring-applied nitrogen management programs. Preliminary studies will examine Russian dandelion as a potential source of high quality rubber as well as other alternative crops for the semi-arid climate and soils of Southern Oregon. Investigators in the technology subprogram developed a mapserver application that analyzes quantitative tolerances and functions for depicting areas for forage, biofuels and invasive species. Information was disseminated at grower meetings, experiment station field days and tours, national conferences and commodity commission meetings and through the Web. Results were published in journals, monographs and books.

## 2. Brief description of the target audience

Professional peers, scientific communities and agricultural representatives  
 State commodity commissions, grower groups, trade organizations  
 Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies  
 County, state and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service, Soil and Water Conservation Districts, urban biosolid handlers,  
 Undergraduate and graduate students being trained in extension and research activities

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	750	5000	50	0
2007	1150	2700	75	200

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	8	3	11

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	33	40

**Output #2****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - A comprehensive understanding of the morphological, physiological and/or genetic basis for plant responses in studied management systems to
  - nutrients
  - temperature, moisture and other abiotic stresses
  - plant growth regulators
  - attack by other organisms - Develop and promote strategies for nitrogen management, growth regulators, abiotic stresses, post-harvest management, and alternative crops for pest and weed management

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	7

**Output #3****Output Measure**

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES  
Work with plant breeding and genetics colleagues to release new varieties for general public and/or licensed release. Information on best management practices for new varieties will be developed

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	1

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	New management systems will be developed and shared with end users; information will be adapted for use in other areas of the nation or world
2	new management systems will be adopted by end users
3	<ul style="list-style-type: none"><li>• Agricultural producers will realize greater economic return in their cropping enterprises;</li><li>• Plant nutrient and other production input use will be optimized</li></ul>

**Outcome #1****1. Outcome Measures**

New management systems will be developed and shared with end users; information will be adapted for use in other areas of the nation or world

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	4

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Program participants are working to develop and apply the best tools of contemporary plant and soil sciences to address the challenges and opportunities facing the agricultural industry and natural resource communities of Oregon through field and laboratory research.

**What has been done**

Investigators in the nutrient management subprogram developed guidance for land application of byproducts, and produced a calibrated soil test that accurately predicts spring fertilizer rate, analyzed plant nutrient tissue and uptake to determine the levels of potassium and sulfur fertilization effect on yield, quality and nutrient uptake of plants. Investigators in the plant management subprogram conducted field trials to develop new alfalfa species and varieties adapted to Central Oregon. On-farm trials were used extensively to assist grass seed growers in developing economically and environmentally responsible spring-applied nitrogen management programs. Preliminary studies will examine Russian dandelion as a potential source of high quality rubber as well as other alternative crops for the semi-arid climate and soils of Southern Oregon. Investigators in the technology subprogram developed a mapserver application that analyzes quantitative tolerances and functions for depicting areas for forage, biofuels and invasive species.

**Results**

The nutrient management subprogram developed new applied knowledge to guide beneficial use of byproducts from municipal, industrial and agricultural sources. Scientifically-based guidance provides economic benefits for byproduct generators and farmers, and assists in environmental protection through a reduction in excessive nutrient applications. New varieties discovered through the plant management subprogram increase profitability to growers through increased yields and, sometimes, a higher quality product. Also development of alternative crops will contribute to crop diversification in rural areas of Oregon, which should help stabilize the economic cycle. Investigators plan to release a new winter forage barley variety in the near future. Utilizing new technologies, such as mapping software, is beneficial to agriculture through improved management, more informed agricultural policies, and increased environmental sustainability.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships
511	New and Improved Non-Food Products and Processes

**Outcome #2****1. Outcome Measures**

new management systems will be adopted by end users

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #3****1. Outcome Measures**

- Agricultural producers will realize greater economic return in their cropping enterprises;
- Plant nutrient and other production input use will be optimized

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #17**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Field Crop Pest Management and Biology

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	35%		35%	
212	Pathogens and Nematodes Affecting Plants	1%		1%	
213	Weeds Affecting Plants	52%		52%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	1%		1%	
215	Biological Control of Pests Affecting Plants	4%		4%	
216	Integrated Pest Management Systems	7%		7%	
<b>Total</b>		100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.6	0.0	4.5	0.0
<b>Actual</b>	0.6	0.0	1.3	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	41476	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	638115	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	374752	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**



Investigators in this program are developing and applying the best tools in contemporary pest management sciences. Through pesticide trials, investigators are evaluating fungicides for control of powdery mildew, ergot and stripe rust, new herbicides for bluegrass seed pests. Investigators conducting pest biology trials are focusing efforts on effective methods to control the winter grain mite and developing practices that will increase weed seed mortality rates. This subprogram is also conducting surveys to identify existing pest complexes affecting grass seed production, a major industry in Oregon. The plant breeding and genetics subprogram is evaluating the effectiveness of growth regulators Palisade and Apogee on Kentucky and rough bluegrass. Ultimately, this program will produce pest management strategies based on knowledge gained. One such strategy is an IPM strategy for control of spider mites, eriophyid mites and powdery mildew diseases on grapes and hops. This program minimizes pesticide use, promotes biocontrol, and understands the phenology and nature of the pests and their natural enemies involved in the systems. Results were shared through field days, program websites, publications, presentations at various industry conferences and commodity commission meetings.

**2. Brief description of the target audience**

- Professional peers and scientific communities
- State commodity commissions and grower groups
- Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies
- County, state and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service, Soil and Water Conservation Districts, county road managers, fish and wildlife agencies
- Undergraduate and graduate students being trained in extension and research activities

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	500	5000	50	0
2007	446	983	24	120

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	3	2	5

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	40	20

**Output #2****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - assess effectiveness and cropping system interactions for pesticides which control via pesticide trials at lab, growth chamber, greenhouse, small plot and/or field scale levels

- slugs, symphilids, billbugs and other subsurface insects in seed crop cropping systems

- grass and broadleaf weeds in seed crop, grain and vegetable systems cereal rust and foot rot pathogen - develop basic knowledge of pests by conducting pest biology trials at lab, growth chamber, greenhouse, small plot and/or field scale levels

- slugs, symphilids, crane flies, cereal leaf beetle

- native and invasive grassy and broadleaf weeds including wild oat, brome spp., jointed goatgrass, annual bluegrass, and clover broomrape

- Sudden oak death and orchardgrass choke pathogens

- biocontrol of cereal leaf beetle - Work with plant breeding and genetics colleagues to release new crop varieties with herbicide resistance.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	10

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Pest management activities are shared with peers and end users <ul style="list-style-type: none"> <li>• New pesticides will be registered;</li> <li>• new pest management systems will be developed and shared with end users;</li> <li>• basic pest biology information will be shared with professional colleagues;</li> <li>• new research methods and discoveries will be published</li> </ul>
2	End users adopt new pesticide and pest management systems and strategies for working with invasive pests will be implemented
3	In the long run, <ul style="list-style-type: none"> <li>• Agricultural producers will realize greater economic return in their enterprises;</li> <li>• Strategies for avoiding invasive pests will be in place</li> </ul>

**Outcome #1****1. Outcome Measures**

Pest management activities are shared with peers and end users

- New pesticides will be registered;
- new pest management systems will be developed and shared with end users;
- basic pest biology information will be shared with professional colleagues;
- new research methods and discoveries will be published

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Over 12% of Oregon's economy can be directly influenced and affected by the success of this research and extension program in pest management. This program will provide the field crop industry with effective tools to control a wide variety of weeds and pests and reduce costs of controlling pests and amounts of herbicides applied.

**What has been done**

Investigators in this program are developing and applying the best tools in contemporary pest management sciences. Through pesticide trials, investigators are evaluating fungicides for control of powdery mildew, ergot and stripe rust, new herbicides for bluegrass seed pests. Investigators conducting pest biology trials are focusing efforts on effective methods to control the winter grain mite and developing practices that will increase weed seed mortality rates. This subprogram is also conducting surveys to identify existing pest complexes affecting grass seed production, a major industry in Oregon. The plant breeding and genetics subprogram is evaluating the effectiveness of growth regulators Palisade and Apogee on Kentucky and rough bluegrass. Ultimately, this program will produce pest management strategies based on knowledge gained. One such strategy is an IPM strategy for control of spider mites, eriophyid mites and powdery mildew diseases on grapes and hops. This program minimizes pesticide use, promotes biocontrol, and understands the phenology and nature of the pests and their natural enemies involved in the systems.

**Results**

Results were shared through field days, program websites, publications, presentations at various industry conferences and commodity commission meetings. This program will continue to enhance management strategies for Kentucky and bluegrass seed production; respond to industry questions concerning currently available products for weed control; develop weed seed mortality practices in wild proso millet seed; survey hops and grapes populations for pest data; and develop a rapid identification tool for the larval stage in two exotic crane fly species.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

**Outcome #2**

**1. Outcome Measures**

End users adopt new pesticide and pest management systems and strategies for working with invasive pests will be implemented

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
216	Integrated Pest Management Systems
215	Biological Control of Pests Affecting Plants

**Outcome #3**

**1. Outcome Measures**

In the long run,

- Agricultural producers will realize greater economic return in their enterprises;
- Strategies for avoiding invasive pests will be in place

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

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**Results****4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
216	Integrated Pest Management Systems

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #18**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Plant Breeding, Genetics, Biotechnology and Crop Quality

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	19%		19%	
202	Plant Genetic Resources	20%		20%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	16%		16%	
204	Plant Product Quality and Utility (Preharvest)	24%		24%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
213	Weeds Affecting Plants	16%		16%	
<b>Total</b>		100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.8	0.0	12.5	0.0
<b>Actual</b>	0.8	0.0	3.8	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	341104	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	4206182	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1660839	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Investigators in this program will continue to develop, refine and utilize contemporary tools in plant breeding, genetics, biology and chemistry to create basic knowledge and to develop new plant varieties, such as barley, meadowfoam, potatoes and wheat, with the best disease and pest tolerance possible and with quality attributes that allow Oregon growers to expand and enter new markets. This program has two major foci: crop variety development and genetic diversity. The crop variety subprogram conducted experiments and activities to develop new potato varieties with high quality yield and resistance to major pests and diseases for the Pacific Northwest industry, including preliminary and advanced potato variety trials and seed increases for future trials, parental evaluation, crossing, multi-years selections and testing. Investigators are also working on development of new types of wheat cultivars with kernel attributes designed for specific end products. Investigators in the genetics subprogram specifically conducted molecular breeding, germplasm screening and evaluation for potato and wheat variety development. Activities in wheat genetics include gene discovery, chromosome manipulation and gene transfer, and gene flow. Classical and contemporary breeding genetics tools will be used to determine the genetic basis of economically important traits. Investigators will also study gene migration, via pollen, seed and vegetative propagules, from transgenic glyphosate resistant creeping bentgrass seed production fields into adjacent areas. Results have been communicated by publications in refereed journals, popular press, and presentations at local, regional, national and international meetings.

**2. Brief description of the target audience**

- Professional peers and scientific communities
- State commodity commissions and grower groups
- Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies
- State and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service
- Undergraduate and graduate students

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	0	0	0	0
2007	550	2000	100	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	18	18

**V(F). State Defined Outputs**

**Output Target**



**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	21	40

**Output #2****Output Measure**

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - breeding programs for barley, meadowfoam, potato, wheat - crop quality work include studies on malt barleys, super soft white wheats, modified wheat starches and proteins, modified potato starches and proteins, assessment of oil quality and quantity in meadowfoam and of glucosinolates in meadowfoam meal.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	3

**Output #3****Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - characterize genetic diversity in economically important crop plants, - identify novel genes, and - carry out molecular breeding in adapted germplasm

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	3

**Output #4****Output Measure**

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS - understand responses to environmental signals, growth and development pathways

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	5

**Output #5****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - understand responses to attack by other organisms

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	5

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<ul style="list-style-type: none"> <li>• Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass</li> <li>• Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release</li> <li>• new research methods and discoveries will be published</li> </ul>
2	With the knowlege produced, released varieties will be adopted by growers; new research methods will be adopted by the research community
3	In the long run,
	<ul style="list-style-type: none"> <li>• Higher-value niche markets will be established for program-developed crops;</li> <li>• Increased opportunities for rural community marketers and processors will be developed;</li> <li>• Public health will be improved through the use of crops with improved nutritional value</li> </ul>

**Outcome #1****1. Outcome Measures**

- Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass
- Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release
- new research methods and discoveries will be published

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	10

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

New crop varieties are needed in order to provide a stable, sustainable and healthy supply of food, fuel and fiber.

**What has been done**

The crop variety subprogram conducted experiments and activities to develop new potato varieties with high quality yield and resistance to major pests and diseases for the Pacific Northwest industry, including preliminary and advanced potato variety trials and seed increases for future trials, parental evaluation, crossing, multi-years selections and testing. Investigators are also working on development of new types of wheat cultivars with kernel attributes designed for specific end products. Investigators in the genetics subprogram specifically conducted molecular breeding, germplasm screening and evaluation for potato and wheat variety development. Activities in wheat genetics include gene discovery, chromosome manipulation and gene transfer, and gene flow. Classical and contemporary breeding genetics tools will be used to determine the genetic basis of economically important traits. Investigators will also study gene migration, via pollen, seed and vegetative propagules, from transgenic glyphosate resistant creeping bentgrass seed production fields into adjacent areas.

**Results**

The TriState Potato Program, which includes OSU, Washington State University, University of Idaho and USDA/ARS, plays an important economic role in the potato industry. OSU has released nine varieties since 1995 and is currently in the process of releasing three additional lines; the TriState Potato program is currently releasing another fourteen. Several selections in the Oregon program appear to offer significant improvements over currently available varieties. The program also includes promising clones with late blight, virus, or nematode resistances. Eventual releases with these characteristics will offer economic advantages for lower input production costs and reduced use of environmentally unfriendly protectants. The Oregon wheat quality program worked with the Oregon wheat breeding program to select for improved wheat quality to enhance export competitiveness of Oregon wheat. This program contributed to the release of 3 wheat varieties: Goetze, Norwest 553 and Tubbs06 and the potential placement of two more lines. These new varieties are now leading in terms of acreage and performance in the Pacific Northwest; the lines help reduce economic losses from grassy weeds, increase management options, and further increase production efficiency. Investigators are also engaged in fundamental studies to further scientific understanding of composition and functionality relationships in wheat-based foods. Wheat genetics investigators have developed 'fast-track' testing in the short period between late-summer harvest and fall replanting of the winter wheats. This has often allowed the breeder to move a promising line forward to seed increase with confirmatory quality data at least one whole year faster than previously. Studies on chromosome manipulations have contributed to advancements in wheat genomics. Investigators studying barley have contributed to a fundamental understanding of the genes that drive adaptation of fall sowing and the genetics of disease resistance, which is resulting in barley varieties that will yield more nutritious and valuable grain.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

204	Plant Product Quality and Utility (Preharvest)
213	Weeds Affecting Plants
202	Plant Genetic Resources
212	Pathogens and Nematodes Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #2****1. Outcome Measures**

With the knowledge produced, released varieties will be adopted by growers; new research methods will be adopted by the research community

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	10

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

New crop varieties are needed in order to provide a stable, sustainable and healthy supply of food, fuel and fiber. The Pacific Northwest produces 60 percent of the U.S. fall potato crop.

**What has been done**

Investigators developed new varieties of potato, wheat and barley.

**Results**

These new varieties are now leading in terms of acreage and performance in the Pacific Northwest

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #3****1. Outcome Measures**

In the long run,

- Higher-value niche markets will be established for program-developed crops;
- Increased opportunities for rural community marketers and processors will be developed;
- Public health will be improved through the use of crops with improved nutritional value

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #19**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Soil, Water, and Environmental Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			22%	
102	Soil, Plant, Water, Nutrient Relationships			58%	
103	Management of Saline and Sodic Soils and Salinity			8%	
136	Conservation of Biological Diversity			12%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.7	0.0
<b>Actual</b>	0.0	0.0	3.6	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	82229	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1265101	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	504464	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The goal of this program is to develop basic soil science knowledge so that current and future issues related to the functioning of soils can be addressed in a scientifically sound manner. Researchers are developing basic and applied knowledge to better understand the roles soils play in meeting life necessities and how soils function in their natural environment. Investigators in the fluxes of energy and mass subprogram work to find agronomic methods that can be used to improve agricultural production and reliability while advancing long-term soils resource sustainability. Results from these studies will produce recommendations for agronomic practices. Investigators in the microbial community dynamics subgroup are focused primarily upon the dynamics of organic nitrogen and nutrient cycling in soil. They measure gross rates of N production and consumption in soils that have been manipulated in terms of organic matter inputs. They have conducted studies in diverse Oregon soils under different forest types to determine the relative contribution of bacteria and fungi to nutrient cycling. Investigators have also developed innovative collection wells designed to maintain the chemical integrity of soil formed under reducing conditions. New research intends to examine the variation in nitrification and the communities of nitrifying microorganisms across a soil landscape and in response to N availability. Investigators in the soil-landscape subprogram work primarily through the Landscape Pedology Lab, which is involved in next-generation Digital Soil Mapping around Oregon and elsewhere around the globe. They have conducted individual predictive soil map experiments throughout the state. The lead PI on this project has developed the Mobile Digital Classroom, a pedagogical tool involving wireless technology, to instruct Digital Soil Mapping in the field. Information was disseminated through peer-reviewed publications and presentations at field days, national and international meetings and taught to undergraduate and graduate students.

## 2. Brief description of the target audience

Professional peers and scientific communities

State, federal, and international agencies—Soil and Water Conservation Districts, Natural Resource Conservation Service, Oregon Department of Agriculture, Department of Energy, USDA, NSF, United Nations

Natural resource and agricultural industry clientele

Undergraduate and graduate students being trained in research activities

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	1000	0	0
2007	0	0	0	0

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year    Target

Plan:    0

2007 :    0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	14	14

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	18	40

**Output #2****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY – improve understanding about fluxes of energy and mass in soils by peers and clients – improve understanding of how abiotic and biotic factors influence size and composition of microbial communities in soil and how microorganisms affect key soil and plant processes. – Assess soil-landscape evolution in Oregon and partition soil respiration measurements on the landscape scale

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	900	11



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	New research methods and discoveries will be published in the areas of fluid movement through soils, biogeochemical recycling in soils, carbon and nitrogen cycling in soils, microbial diversity in soils, and soil-landscape evolution.
2	New research methods will be adopted by the research community. Research on fluid flows in soils will allow for better waste material containment facility design. Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations. Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities.
3	Nuclear and other waste storage will be safer. Global warming will be addressed in part by carbon sequestration strategies. Soil microbial health will be maintained or improved. Soil maps will be available as a resource assessment tool where they are now not available.

**Outcome #1****1. Outcome Measures**

New research methods and discoveries will be published in the areas of fluid movement through soils, biogeochemical recycling in soils, carbon and nitrogen cycling in soils, microbial diversity in soils, and soil-landscape evolution.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	300	14

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The goal of this program is to develop basic soil science knowledge so that current and future issues related to the functioning of soils can be addressed in a scientifically sound manner. Researchers are developing basic and applied knowledge to better understand the roles soils play in meeting life necessities and how soils function in their natural environment.

**What has been done**

Investigators in the fluxes of energy and mass subprogram work to find agronomic methods that can be used to improve agricultural production and reliability while advancing long-term soils resource sustainability. Results from these studies will produce recommendations for agronomic practices. Investigators in the microbial community dynamics subgroup are focused primarily upon the dynamics of organic nitrogen and nutrient cycling in soil. They measure gross rates of N production and consumption in soils that have been manipulated in terms of organic matter inputs. They have conducted studies in diverse Oregon soils under different forest types to determine the relative contribution of bacteria and fungi to nutrient cycling. Investigators have also developed innovative collection wells designed to maintain the chemical integrity of soil formed under reducing conditions. New research intends to examine the variation in nitrification and the communities of nitrifying microorganisms across a soil landscape and in response to N availability. Investigators in the soil-landscape subprogram work primarily through the Landscape Pedology Lab, which is involved in next-generation Digital Soil Mapping around Oregon and elsewhere around the globe. They have conducted individual predictive soil map experiments throughout the state. The lead PI on this project has developed the Mobile Digital Classroom, a pedagogical tool involving wireless technology, to instruct Digital Soil Mapping in the field.

**Results**

Results from work in the energy fluxes subprogram include quantification of improved groundwater recharge, increased soil moisture, and improved crop survivability and productivity when crop is interplanted with *G. senegalensis*, a native shrub. Current research in the microbial dynamics subprogram has confirmed earlier findings about linkages between plant inputs of C and the functioning of soil microbial communities in the cycling of N and C. This work was one of the first to trace photosynthate into members of the soil and to demonstrate the presence of ammonia-oxidizing archaea in forested ecosystems. This information may be important in soils management. Other results have demonstrated unequivocally that both bacteria and fungi can assimilate organic N directly in soil, and that the relative contribution of bacteria to the process is influenced by the N status of the soil at the site. Results in the soil landscape subprogram were analyzed to yield the basic, driving mechanisms behind soil development on a spatial and temporal basis.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
101	Appraisal of Soil Resources
136	Conservation of Biological Diversity

**Outcome #2****1. Outcome Measures**

New research methods will be adopted by the research community. Research on fluid flows in soils will allow for better waste material containment facility design. Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations. Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships

**Outcome #3****1. Outcome Measures**

Nuclear and other waste storage will be safer. Global warming will be addressed in part by carbon sequestration strategies. Soil microbial health will be maintained or improved. Soil maps will be available as a resource assessment tool where they are now not available.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #20**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Dryland Cropping Systems

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	32%		32%	
111	Conservation and Efficient Use of Water	8%		8%	
205	Plant Management Systems	11%		11%	
212	Pathogens and Nematodes Affecting Plants	26%		26%	
213	Weeds Affecting Plants	23%		23%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.2	0.0	8.2	0.0
<b>Actual</b>	0.3	0.0	2.4	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	64423	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	991146	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	484938	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The goal of this program is to utilize existing research and extension tools and to develop and apply improved tools of agronomy, plant pathology, soil science, and weed science and biology to address the challenges facing dryland crop producers. Investigators will utilize laboratory, greenhouse and field research to identify and implement improved practices for soil and water management; biology and management and diseases, nematodes and weeds; plant nutrition, and potential alternate crops. Weed management subprogram investigated the potential for sweep tillage with chemical fallow. Four systems were evaluated for their impact on seed-zone soil moisture, surface residue and roughness, weed population dynamics and response of the winter wheat crop following these fallow treatments. The agronomy subprogram has three main research focus areas: cropping systems, alternative crops and organic farming. Investigators conducted field experiments to evaluate direct seeding cropping systems, rotational benefits of alternative crops such as safflower, chickpea, winter peas and mustard, and weed control methods in wheat-based organic farming systems. Plant pathology subprogram coordinated the completion of a number of experiments at field sites. The focus of these experiments was to develop new knowledge regarding the tolerance of domestic wheat and barley cultivars and advanced breeding lines to infections by soil-borne plant pathogenic fungi that cause crown rot and to parasitism by root-lesion nematodes. Soil and water management subprogram investigators conducted cropping systems research on variety development of winter and spring Brassica crops of canola, camelina, and yellow and brown mustard. Results have been published in peer-review journals, extension bulletins, and referenced book, and presented at national conferences and field days.

## 2. Brief description of the target audience

Professional peers and scientific communities

State commodity commissions and grower groups

Natural resource industry clientele – growers, field representatives, grower co-ops and partnerships, processors and handlers, export companies, importing companies

State and federal agencies – Oregon Department of Agriculture, Natural Resources Conservation Service.

Bureau of Indian Affairs, Confederated Tribes of the Umatilla Indian Reservation, US Forest Service, Bureau of Land Management.

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	5000	15000	250	1000
2007	1658	25500	54	1435

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year Target

Plan: 0

2007 : 0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	3	10	13

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	8	30

**Output #2****Output Measure**

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS (Machado, Wysocki, Petrie) Identification of suitable alternative crops for wheat-based crop rotations; determination of best management practices for alternative crops Control of downy brome and other weeds through extracts from broadleaf plants (natural herbicides) Cultivar testing on canola and mustard Nutrient and crop management extension recommendations Improved nitrogen management strategies for soft white wheat Improved nutrient recommendations for soft white wheat grown in conservation tillage systems and for potential alternative cereal crops

Year	Target	Actual
2007	20	11

**Output #3****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS (Smiley, Ball) development and release of wheat cultivars with improved capacity to resist or tolerate infections by plant-pathogenic fungi (*Bipolaris sorokiniana*, *Fusarium culmorum*, and *F. pseudograminearum*) and plant-parasitic nematodes (*Heterodera avenae*, *Pratylenchus neglectus*, and *P. thornei*). integrate disease resistant cultivars into existing, but inadequate as "stand-alone" cultural management procedures including manipulation of tillage systems, planting equipment, planting dates, fertilizer placement, fungicide seed treatments, and others. Large plot studies conducted in commercial wheat fields to develop season-long chemical fallow management systems. Compare chemical fallow treatments with conventional tilled summer. Identify optimum inputs and agronomically compatible weed management in alternate crops Evaluate new herbicide candidates and non-chemical cultural practices under field conditions for weed control effectiveness, crop safety, and soil persistence under eastern Oregon dryland conditions.

Year	Target	Actual
2007	10	1

**Output #4****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY (Wysocki, Petrie) Nutrient and crop management extension recommendations Improved nitrogen management strategies for soft white wheat Improved nutrient recommendations for soft white wheat grown in conservation tillage systems and for potential alternative cereal crops

Year	Target	Actual
2007	5	1

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Improved strategies and cultivars</p> <ul style="list-style-type: none"> <li>• Basic agronomic practices for commercially promising alternative crops under reduced tillage systems.</li> <li>• Natural herbicides to control weeds in organic and/or no-till wheat production</li> <li>• Disease resistant wheat lines</li> <li>• Improved weed control in no-till fallow systems, including optimum inputs</li> <li>• New herbicide candidates</li> <li>• Improved nutrient and crop management</li> <li>• Rotational crop cultivars</li> </ul>
2	<p>More profitable production Improved economic and biological sustainability of cropping systems in eastern Oregon            No-till (direct-seed) organic wheat production Wheat breeders develop disease resistant cultivars for release            Effective weed management in dryland crops Canola established as rotation crop in semiarid Oregon with markets            and added value in local, rural communities Profitable alternative cereal crops for dryland cropping systems in the            PNW</p>
3	<p>Sustainable production Sustainable and economically viable wheat and dryland cropping industryfor vibrant rural            economy in eastern Oregon</p> <ul style="list-style-type: none"> <li>• Improved soil, water, and crop management practices and strategies that protect Oregon resources</li> </ul>



**Outcome #1****1. Outcome Measures**

Improved strategies and cultivars

- Basic agronomic practices for commercially promising alternative crops under reduced tillage systems.
- Natural herbicides to control weeds in organic and/or no-till wheat production
- Disease resistant wheat lines
- Improved weed control in no-till fallow systems, including optimum inputs
- New herbicide candidates
- Improved nutrient and crop management
- Rotational crop cultivars

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

The ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening the rural communities of Oregon and conserving the soil and water resources.

**What has been done**

Weed management subprogram investigated the potential for sweep tillage with chemical fallow. Four systems were evaluated for their impact on seed-zone soil moisture, surface residue and roughness, weed population dynamics and response of the winter wheat crop following these fallow treatments. Investigators conducted field experiments to evaluate direct seeding cropping systems, rotational benefits of alternative crops such as safflower, chickpea, winter peas and mustard, and weed control methods in wheat-based organic farming systems.

**Results**

Weed management subprogram seeks to replace the more erosive dust-mulch fallow with chemical fallow systems. Treatment comparisons in year one showed greater tumble pigweed density and biomass in non-rodweeded treatments compared in test area 1 to rodweeded treatments at test area 2, but no difference in density and biomass of Russian thistle or grasses. Results in the agronomy subprogram have demonstrated differences between direct seeding and conventional fallow; identified a number of safflower cultivars that are suitable to eastern Oregon growing conditions; and developed a combination of management techniques that was able to keep weeds under control.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants

**Outcome #2****1. Outcome Measures**

More profitable production Improved economic and biological sustainability of cropping systems in eastern Oregon No-till (direct-seed) organic wheat production Wheat breeders develop disease resistant cultivars for release Effective weed management in dryland crops Canola established as rotation crop in semiarid Oregon with markets and added value in local, rural communities Profitable alternative cereal crops for dryland cropping systems in the PNW

## 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	2

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening the rural communities of Oregon and conserving the soil and water resources. Information from this subprogram is helping growers refine fertility rates and apply the appropriate amount of nitrogen, phosphorus and sulfur.

#### What has been done

Plant pathology subprogram coordinated the completion of a number of experiments at field sites. The focus of these experiments was to develop new knowledge regarding the tolerance of domestic wheat and barley cultivars and advanced breeding lines to infections by soil-borne plant pathogenic fungi that cause crown rot and to parasitism by root-lesion nematodes. Soil and water management subprogram investigators conducted cropping systems research on variety development of winter and spring Brassica crops of canola, camelina, and yellow and brown mustard.

#### Results

Plant pathology results contributed to significant new understanding to the biology and control of root-lesion nematode (RLN), cereal cyst nematode (CCN), and Fusarium crown rot (FCR). Canola research in the soil and water management subprogram has enabled growers to direct seed into chemical fallow and produced acceptable stands and consistent yields.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
212	Pathogens and Nematodes Affecting Plants
205	Plant Management Systems

## Outcome #3

### 1. Outcome Measures

Sustainable production Sustainable and economically viable wheat and dryland cropping industry for vibrant rural economy in eastern Oregon

- Improved soil, water, and crop management practices and strategies that protect Oregon resources

### 2. Associated Institution Types

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
205	Plant Management Systems
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #21**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Soil and Water Resource Conservation, Management and Engineering

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			10%	
102	Soil, Plant, Water, Nutrient Relationships			10%	
111	Conservation and Efficient Use of Water			10%	
112	Watershed Protection and Management			10%	
132	Weather and Climate			10%	
133	Pollution Prevention and Mitigation			10%	
403	Waste Disposal, Recycling, and Reuse			10%	
404	Instrumentation and Control Systems			10%	
405	Drainage and Irrigation Systems and Facilities			10%	
902	Administration of Projects and Programs			10%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.5	0.0	5.0	0.0
<b>Actual</b>	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.
- Construct Research Facilities.
- Monitor and evaluate
- Conduct Workshops, meetings.
- Deliver Services.
- Develop Products, Curriculum, Resources.
- Provide Training.
- Assessments.
- Partnering.

**2. Brief description of the target audience**

The audience includes typical citizens in urban settings through extension outreach, those responsible for agricultural production through extension outreach and workshops, the engineering profession through publication of results in professional journals, and undergraduate and graduate students through presentation of project descriptions and results in a classroom setting.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	200	300	50	100
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

**Year    Target**  
**Plan:**    0  
 2007 :    {No Data Entered}

**Patents listed**

{No Data Entered}

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	{No Data Entered}	{No Data Entered}	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	2	0

**Output #2****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY Investigate optimization of water resource utilization within hydrologic and agricultural environments considering the soil-plant-atmosphere continuum. Understand feedbacks between plants, soil hydraulic processes and atmospheric boundary layer development and the partitioning of all components of the diurnal energy balance. Apply recently developed spatial analysis techniques with current meteorological network data available to develop updated maps of reference evapotranspiration over the state of Oregon for water resources planning and hydrologic analysis. Develop a flume facility to demonstrate general river mechanics principles and to test hypotheses regarding the physical response of rivers to management strategies, such as dam removal, stabilizing structures, and environmental flows. Monitor and evaluate the dynamics and variability in fish and benthic macroinvertebrate communities Document natural processes and indicate ecological outcomes of management strategies.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	10	0

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	Informed decision-makers and citizenry Understanding of the interconnectivity of soil and water resources, aquatic species habitat and survival, water resource allocation for multiple urban, environmental, hydroelectric power, industrial and agricultural uses. Revision of Oregon Irrigation Water Requirements guide Inform the citizenry of the state of Oregon, as well as provide scientific assessment tools and resource evaluation for policy makers to base decisions on in the state of Oregon.
2	Informed policy-making and management Informed policy-making and management of landscape and water resources. Extension faculty in cooperation with watershed councils provide outreach on well water quality, crop water use estimates, and irrigation management for improved watershed management.
3	National and international impact as evidenced by the past record of professional publications and the cooperative international programs this group is involved with.

**Outcome #1****1. Outcome Measures**

Informed decision-makers and citizenry Understanding of the interconnectivity of soil and water resources, aquatic species habitat and survival, water resource allocation for multiple urban, environmental, hydroelectric power, industrial and agricultural uses. Revision of Oregon Irrigation Water Requirements guide Inform the citizenry of the state of Oregon, as well as provide scientific assessment tools and resource evaluation for policy makers to base decisions on in the state of Oregon.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

**Outcome #2****1. Outcome Measures**

Informed policy-making and management Informed policy-making and management of landscape and water resources. Extension faculty in cooperation with watershed councils provide outreach on well water quality, crop water use estimates, and irrigation management for improved watershed management.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**



**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
112	Watershed Protection and Management
111	Conservation and Efficient Use of Water

**Outcome #3****1. Outcome Measures**

National and international impact as evidenced by the past record of professional publications and the cooperative international programs this group is involved with.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Before-After (before and after program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #22**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Biological Control of Pests Affecting Plants

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
215	Biological Control of Pests Affecting Plants	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.2	0.0
<b>Actual</b>	0.1	0.0	1.1	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	44423	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	683453	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	332611	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

This program seeks to develop management strategies in the control of fire blight disease of pear, invasive weed species, and diseases of wheat, use of bacterial antagonists, natural enemies, and genetic diversity. The subprogram epidemiology and control of diseases of fruit crops in western Oregon will: improve control of fire blight of pear and apple; evaluate the risk of movement of the fire blight pathogen associated with pear fruit; and enhance knowledge of the biology and management of blackberry rust in the PNW. The subprogram biological control of weeds will measure the contribution of plant dormancy and insect dispersal to regulation of low-level populations of ragwort; monitor weed biocontrol organisms for increase, spread, and impact on purple loosestrife; measure ecological impacts of invasive plants on native plant and animal communities; monitor weed biocontrol organisms for establishment, performance and impact on non-target organisms; and release, establish and redistribute natural enemies. Specifically, investigators evaluated combinations of biological control agents in field trials. The subprogram dispersive epidemic waves will determine if host abundance, heterogeneity, and spatial structure influence the spatiotemporal spread of plant disease; determine if increased focus size speeds the onset of epidemic velocity increase over time; and determine if disease spread and effects of landscape variables are similar at different spatial scales. Specific activities include analyzing the shape and distribution of the invader's path, reviewing scientific basis for predicting invasions and analyzing the causes and consequences of variation in state weed lists. Results have been published in scientific journals and textbooks and presented at scientific meetings, national workshops and experiment station field days.

**2. Brief description of the target audience**

The target audiences include growers, crop consultants, extension faculty and researchers in the fruit and wheat industry; and ecologists, economists, policymakers, and managers concerned with invasive species.

**V(E). Planned Program (Outputs)****1. Standard output measures****Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	1050	1000	5	0
2007	1470	400	500	0

**2. Number of Patent Applications Submitted (Standard Research Output)****Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed****3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	1	1

**V(F). State Defined Outputs****Output Target****Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	3

**Output #2****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - Determine control of fire blight of pear and apple with the use of avirulent pathogens, including whether they induce defense responses in the host - Determine the risk of movement of the fire blight pathogen with mature symptomless pear fruit. - Determine when rust spores are first released in spring and the minimum environmental requirements for infection of leaves. - Understand the potential impact of the introduced pathogen, blackberry rust, in the Pacific Northwest region and evaluate chemical control programs for susceptible cultivars. - - Reduce harm from invasive plant species like ragwort or purple loosestrife, through biological control - - Determine if host abundance, heterogeneity, and spatial structure influence the spatiotemporal spread of disease. - Determine if increased focus size speeds the onset of velocity increase over time. - Determine if disease spread and effects of landscape variables are similar at different spatial scales. - Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	15	15

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Genetic studies <ul style="list-style-type: none"> <li>• Determine susceptibility of blackberry germplasm,</li> <li>• Compare the genotypes of <i>P. violaceum</i> present in the Pacific Northwest to the genotypes in other regions.</li> </ul>
2	Models: <ul style="list-style-type: none"> <li>• Develop weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves.</li> <li>• Compare chemical control programs for susceptible cultivars for economic feasibility</li> <li>• Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread. .</li> </ul>
3	Best Practices ...5%/yr Increase learning, awareness, knowledge, skills, motivations, conformity to codes of best practices related to use of biological control to combat invasive plant specie
4	Improved technologies and practices Develop technologies that enhance the ability of the U.S pear and apple industry to suppress this disease. Develop economical chemical control programs for susceptible cultivars Develop novel control approaches to other diseases of plants. Changes in behavior, practices, decision-making, policies with respect to invasive species and biological control. Develop epidemic modeling at large scales
5	In the long term: <ul style="list-style-type: none"> <li>• Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears.</li> <li>• Pest impacts on social, economic, environmental, and civic conditions are continuously updated and published in collaboration with ecologists, economists, manager</li> <li>• Provide more sustainable approaches for managing plant disease.</li> </ul>

**Outcome #1****1. Outcome Measures**

Genetic studies

- Determine susceptibility of blackberry germplasm,
- Compare the genotypes of *P. violaceum* present in the Pacific Northwest to the genotypes in other regions.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	2	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

plant scientists, agricultural producers

**What has been done**

Enhance the knowledge of the biology and management of blackberry rust in the Pacific Northwest through genetic studies.

**Results**

Ongoing research will continue to add to the knowledge base.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

**Outcome #2****1. Outcome Measures**

Models:

- Develop weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves.
- Compare chemical control programs for susceptible cultivars for economic feasibility
- Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread. .

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	3	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

policymakers, plant scientists, agricultural producers, public agencies, land managers, natural resource and weed control specialists, extension specialists and agents

**What has been done**

The subprogram dispersive epidemic waves will determine if host abundance, heterogeneity, and spatial structure influence the spatiotemporal spread of plant disease; determine if increased focus size speeds the onset of epidemic velocity increase over time; and determine if disease spread and effects of landscape variables are similar at different spatial scales. Specific activities include analyzing the shape and distribution of the invader's path, reviewing scientific basis for predicting invasions and analyzing the causes and consequences of variation in state weed lists.

**Results**

Investigators in the dispersive epidemic waves subprogram have developed an alternate theory to the currently accepted spatiotemporal theory: the 'accelerating wave' model may provide a more realistic basis for studying the spread of organisms capable of long distance dispersal.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

**Outcome #3****1. Outcome Measures**

Best Practices ...5%/yr Increase learning, awareness, knowledge, skills, motivations, conformity to codes of best practices related to use of biological control to combat invasive plant specie

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
215	Biological Control of Pests Affecting Plants

**Outcome #4****1. Outcome Measures**

Improved technologies and practices Develop technologies that enhance the ability of the U.S pear and apple industry to suppress this disease. Develop economical chemical control programs for susceptible cultivars Develop novel control approaches to other diseases of plants. Changes in behavior, practices, decision-making, policies with respect to invasive species and biological control. Develop epidemic modeling at large scales

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

plant scientists, agricultural producers, extension agents. Results from this program will significantly impact Oregon agriculture, which suffers from crop and timber losses each year due to invasive non-indigenous plants and plant pests.

**What has been done**

Investigators have improved control of fire blight of pear and apple and evaluated the risk of movement of the fire blight pathogen associated with pear fruit.

**Results**

Results of the biological control subprogram are demonstrating that biological controls of fire blight, a bacterial disease of pear and apple, can be enhanced and therefore a widely used management strategy.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
215	Biological Control of Pests Affecting Plants

**Outcome #5****1. Outcome Measures**

In the long term:

- Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears.
- Pest impacts on social, economic, environmental, and civic conditions are continuously updated and published in collaboration with ecologists, economists, manager
- Provide more sustainable approaches for managing plant disease.

**2. Associated Institution Types**

•1862 Research



**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Before-After (before and after program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #23****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Plant Genome, Genetics, and Genetic Mechanisms

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms			100%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	2.3	0.0
<b>Actual</b>	0.0	0.0	1.8	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	25383	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	390513	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1933708	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The ultimate goal of this project is to examine the fundamental molecular mechanisms critical to plant production and associated agricultural practices. Investigators made progress toward this goal, through investigations of ammonia metabolism of *N. europaea*, as well as other ammonia oxidizers and nitrite oxidizers. Work was also done to develop a two-step, high throughput functional screen to identify type II effectors of Rhizobia; investigators have demonstrated success with this process. Another investigator is focused on understanding the gene expression patterns that are essential for reproductive success in corn. This research uses microarrays to characterize the transcripts of maize pollen and embryos at different stages of development and in different genetic backgrounds. Results were published in refereed articles and conference proceedings.

**2. Brief description of the target audience**

Policymakers, plant scientists, agricultural producers, environmentalists, public agencies, land managers, natural resource and weed control specialists, students, extension specialist/agents

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	100	0	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	4	4

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	4

**Output #2**

**Output Measure**

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF BACTERIA AND VIRUSES AND OTHER MICROORGANISMS - Comparative genomics studies will provide insights to the evolutionary history and the niche of nitrifying bacteria within microbial communities and the unique niches of different species of nitrifying bacteria. - Identify differences and similarities among nitrifying bacteria in mono- and co-cultures. - Determine the role of specific genes in the Fe metabolism of *N. europaea*. - Determine if specific genes are required for the obligate lithoautotrophic lifestyle and use metabolic flux analyses to model metabolism in *N. europaea* grown on different carbon sources.
  - identify co-regulated gene sets by their function.
  - further understand the interaction of antagonistic signaling pathways regulate the switch between embryogenesis and the maturation phase of maize embryo development.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	4

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Genes and genetic mechanisms determine sets of genes involved in processes critical to the functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy. test two new hypotheses regarding the regulation of embryo maturation in cereals. answer fundamental questions regarding developmental timing, mechanisms of hormone interaction, and specificity of Rop function. Our results will be relevant to "cross-talk" in hormone signaling, an increasingly important topic in plant biology.</p>
2	<p>Knowledge contributes to:</p> <ul style="list-style-type: none"> <li>• understanding of the molecular underpinnings involved in the processes that combine to make up nitrification.</li> <li>• determining patterns of coordinated gene expression and hormone regulated expression.</li> </ul>
3	<p>In the long term:</p> <ul style="list-style-type: none"> <li>• Mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment by a thorough understanding of their metabolism.</li> <li>• Avoiding failure of seeds to mature properly results in significant gains of yield and quality.</li> </ul>

**Outcome #1****1. Outcome Measures**

Genes and genetic mechanisms determine sets of genes involved in processes critical to the functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy. test two new hypotheses regarding the regulation of embryo maturation in cereals. answer fundamental questions regarding developmental timing, mechanisms of hormone interaction, and specificity of Rop function. Our results will be relevant to "cross-talk" in hormone signaling, an increasingly important topic in plant biology.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	6	6

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

This program is expected to mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment, prevent significant loss of yield and quality in cereals through an understanding of the developmental pathways involved in seed maturation. Worldwide, large amounts of industrially-produced nitrogen based fertilizer are applied to crops annually. Nitrate is readily leached from soils into groundwater and surface waters, often contributing to eutrophication and making the water unfit for human consumption.

**What has been done**

Investigators made progress toward this goal, through investigations of ammonia metabolism of *N. europaea*, as well as other ammonia oxidizers and nitrite oxidizers. Work was also done to develop a two-step, high throughput functional screen to identify type II effectors of Rhizobia; another investigator is focused on understanding the gene expression patterns that are essential for reproductive success in corn. This research uses microarrays to characterize the transcripts of maize pollen and embryos at different stages of development and in different genetic backgrounds.

**Results**

investigators in this program are demonstration that ammonia oxidizers are beneficial to the treatment of wastewaters and they show potential for bioremediation of contaminated soils. Researchers investigating corn pollination have developed a characterization of the maize pollen transcriptome at both mature and germinating stages, and of the embryo transcriptome at pre-maturation and maturation stages. Researchers have also identified a second rop gene, rop9, that is important for pollen function and competitiveness in vivo.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #2****1. Outcome Measures**

Knowledge contributes to:

- understanding of the molecular underpinnings involved in the processes that combine to make up nitrification.
- determining patterns of coordinated gene expression and hormone regulated expression.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Worldwide, large amounts of industrially-produced nitrogen based fertilizer are applied to crops annually. Nitrate is readily leached from soils into groundwater and surface waters, often contributing to eutrophication and making the water unfit for human consumption.

**What has been done**

Investigations of ammonia metabolism of *N. europaea*, as well as other ammonia oxidizers and nitrite oxidizers.

**Results**

results should be relevant to other specialist bacteria and may contribute to the understanding of specialist metabolism in general.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

**Outcome #3****1. Outcome Measures**

In the long term:

- Mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment by a thorough understanding of their metabolism.
- Avoiding failure of seeds to mature properly results in significant gains of yield and quality.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results**

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### 1. Evaluation Studies Planned

- 

##### Evaluation Results

{No Data Entered}

##### Key Items of Evaluation

{No Data Entered}

**Program #24****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Pathogens and Nematodes Affecting Plants (Molecular and Field Programs)

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
212	Pathogens and Nematodes Affecting Plants	100%		100%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.2	0.0	6.4	0.0
<b>Actual</b>	0.2	0.0	3.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	63992	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	984523	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1316998	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

This program utilizes molecular and field activities to control pathogens and nematodes affecting commercial crops. Investigators in the molecular subprogram use tools to develop risk prediction models and to identify and characterize genes involved in pathogenicity and host-specificity, disease susceptibility and resistance, and virus-host interactions and their coevolution. Specifically, investigators analyzed pathogenicity factors and their involvement in disease development in wheat; and conducted experiments to discern the mechanisms of closteroviral movement and the role of virion in this process. Results were presented at regional, national and international meetings, published in leading professional and broad-impact journals and other periodicals, and taught to graduate students. The field subprogram seeks to discover better chemical and cultural management strategies and to design programs to maintain or improve management while reducing use of pesticides and improving grower profitability. Investigators examined the effect of 1-MCP on stem end decay caused by *Botrytis cinerea*, a fungus affecting the d'Anjou pear (*Pyrus communis* L.) fruit, and prestorage treatment in long-term cold storage. Post-harvest management techniques were also evaluated and those deemed promising were integrated into a multi-faceted program. Nematode field trials seek to evaluate metam sodium treatment regimes on suppression of potato tuber damage from Columbia root-knot nematode (*Mediolodogyne chitwoodi*, CRKN). Results have been shared at seminars, experiment station field days and national conferences, and published in peer-reviewed journals and conference proceedings.



**2. Brief description of the target audience**

The target audiences include growers, packers, crop consultants, extension faculty and researchers in the potato and pear industries and in the wheat, grape, and cereal industries.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	500	450	50	0
2007	100	500	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	1	8	9

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	0	20

**Output #2****Output Measure**

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS Research experiments and tests to:
  - understand virus reproduction and transport in plants.
  - technologies for efficient application of viral vectors in grapevine.
  - decay risk prediction models for use in orchards and packinghouses
  - better understand species complex and fungicide sensitivity
  - Understand physiological basis of plant disease resistance and susceptibility
  - Knowledge that fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.
    - Learn that applications would need to be made earlier at higher population levels. It also indicates the importance of sampling to determine population levels before management begins and emphasizes the need for early season application times at high population levels.
    - Design crop management systems for suppression of CRKN using suppressive rotation crops, green manure crops and reduced nematicide use
    - Quantify the efficacy of individual treatments for control of postharvest decay of pear fruit, and quantify and compare the efficacy of treatment programs composed of diverse, multiple control tactics.
    - Identify decay management programs appropriate to various producer objectives.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	4	6

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Genes and genetic mechanisms:</p> <ul style="list-style-type: none"> <li>• Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development.</li> <li>• Knowledge gained will facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community.</li> <li>• Information for the development of resistant wheat germplasm to tan spot.</li> <li>• Determined functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata. We will also design approaches to engineering GLRaV-2 gene expression vectors.</li> <li>• Contribute to understanding molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk</li> <li>• Develop technologies for efficient application of viral vectors in grapevine.</li> <li>• Characterize genes involved in Victoria Blight Disease susceptibility, and uncover relationships between disease susceptibility and disease resistance.</li> </ul>
2	<p>Management tactics</p> <ul style="list-style-type: none"> <li>• Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.</li> <li>• Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear</li> </ul>
3	<p>Disease and pest control of a wide-ranging and serious disease on wheat. apply knowledge to generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies. Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. develop a customized decay control program for each unique pathogen complex. District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices. use of green manure crops in combination with reduced nematicide use is likely to be successful, particularly for short season potato crops. CRKN may be managed with crop rotation sequences, including green manure crops, which suppress nematode populations so that no or minimal nematicides are necessary. Establish that the interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry.</p>
4	<p>Scientific advancement using generated knowledge for furthering our understanding of the fundamental processes of virus-host interactions and coevolution.</p>
5	<p>In the long term:</p> <ul style="list-style-type: none"> <li>• enhance economic opportunities for agricultural producers, and enhance the nation's natural resource base and environment by revealing cost-effective means to control this and other plant diseases and reduce the need for pesticides.</li> <li>• general progress of grapevine industry in US.</li> <li>• biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets.</li> <li>• control of disease</li> <li>• A better understanding of CRKN population cycle and the process of tuber infection will permit nematicides to be applied at more strategic times in the growing season to increase the level of control with less nematicide.</li> <li>• producers maximize the control of postharvest decay within the various production and marketing objectives of producers.</li> </ul>



**Outcome #1****1. Outcome Measures**

Genes and genetic mechanisms:

- Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development.
- Knowledge gained will facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community.
- Information for the development of resistant wheat germplasm to tan spot.
- Determined functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata. We will also design approaches to engineering GLRaV-2 gene expression vectors.
- Contribute to understanding molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk
- Develop technologies for efficient application of viral vectors in grapevine.
- Characterize genes involved in Victoria Blight Disease susceptibility, and uncover relationships between disease susceptibility and disease resistance.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	7	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Pathogens account for significant losses to growers in Oregon and beyond. Results have also contributed to understanding of programmed cell death in plants and likely connections with disease resistance and susceptibility.

**What has been done**

Investigators in the molecular subprogram use tools to develop risk prediction models and to identify and characterize genes involved in pathogenicity and host-specificity, disease susceptibility and resistance, and virus-host interactions and their coevolution. Specifically, investigators analyzed pathogenicity factors and their involvement in disease development in wheat; and conducted experiments to discern the mechanisms of closteroviral movement and the role of virion in this process.

**Results**

Investigators in the molecular subprogram contributed significant and novel information on fundamental aspects of virus-host interactions, mechanisms of plant virus assembly and cell-to-cell movement, and virus evolution. investigators have identified a genetic characterization of plant disease susceptibility, a subject not currently well understood.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

**Outcome #2**

**1. Outcome Measures**

Management tactics

- Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.
- Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Nematodes account for significant losses to growers in Oregon and beyond. Improved management of postharvest fungal decay on pear will reduce the reliance and expense invested in chemical control programs.

**What has been done**

Nematode field trials seek to evaluate metam sodium treatment regimes on suppression of potato tuber damage from Columbia root-knot nematode (*Medoidogyne chitwoodi*, CRKN). Investigators examined the effect of 1-MCP on stem end decay caused by *Botrytis cinerea*, a fungus affecting the d'Anjou pear (*Pyrus communis* L.) fruit, and prestorage treatment in long-term cold storage. Post-harvest management techniques were also evaluated and those deemed promising were integrated into a multi-faceted program.

**Results**

Nematode field trials suggest that experimental treatments may be effective for fields with low nematode population densities and may be less expensive than the current industry practice. In the field subprogram, investigators have identified comprehensive strategies for deployment of new fungicides in combination with nutritional treatments for maximum decay control. Application of these strategies should give conventional producers greater confidence in the storability of their pear crop, allowing increased flexibility in marketing through the winter and reducing loss due to decay.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

**Outcome #3****1. Outcome Measures**

Disease and pest control control of a wide-ranging and serious disease on wheat. apply knowledge to generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies. Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. develop a customized decay control program for each unique pathogen complex. District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices. use of green manure crops in combination with reduced nematicide use is likely to be successful, particularly for short season potato crops. CRKN may be managed with crop rotation sequences, including green manure crops, which suppress nematode populations so that no or minimal nematicides are necessary. Establish that the interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry.

## 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

**What has been done**

**Results**

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

## Outcome #4

### 1. Outcome Measures

Scientific advancement using generated knowledge for furthering our understanding of the fundamental processes of virus-host interactions and coevolution.

### 2. Associated Institution Types

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

**Outcome #5****1. Outcome Measures**

In the long term:

- enhance economic opportunities for agricultural producers, and enhance the nation's natural resource base and environment by revealing cost-effective means to control this and other plant diseases and reduce the need for pesticides.
- general progress of grapevine industry in US.
- biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets.
- control of disease
- A better understanding of CRKN population cycle and the process of tuber infection will permit nematicides to be applied at more strategic times in the growing season to increase the level of control with less nematicide.
- producers maximize the control of postharvest decay within the various production and marketing objectives of producers.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**



**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
212	Pathogens and Nematodes Affecting Plants

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (personnel)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #25**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Agricultural and Emerging Chemicals: Fate, Effect & Exposure

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation	8%		8%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
306	Environmental Stress in Animals	4%		4%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	20%		20%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	1%		1%	
723	Hazards to Human Health and Safety	57%		57%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	1.1	0.0	3.8	0.0
<b>Actual</b>	0.8	0.0	2.5	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	147935	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1338317	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1050642	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The experimental approaches that will be used to meet the specific objectives of these subprograms include field studies in the Oregon, the Pacific Northwest, the U.S., and abroad. In addition, the experimental approaches will also include controlled laboratory experiments and database/model development. The methods that will be employed to reach direct and indirect, youth and adult, target audiences will encompass a variety of media including workshops, seminars, peer-reviewed manuscripts, newsletters, and websites. Expected short-term accomplishments that will result from successful completion of this five-year program include peer-reviewed manuscripts and other forms of information dissemination. Over the mid- to long term, the data and information generated as part of this Program will contribute to risk assessment and risk-based policy decisions and to the continued development of the theoretical understanding of processes affecting contaminant fate and exposure and on the effects of contaminant exposure on human and aquatic and terrestrial organism health.

**2. Brief description of the target audience**

There are diverse audiences for information this project generates. They can be classified into three general groups. (1) the general public and those in the food production system. (2) State and Federal regulatory agencies. (3) The research community: including scientists working in governmental, industrial, and academic sectors.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	4750	21700	250	3000
2007	500	1200	25	100

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
Plan:	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	3	3

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	17	10

**Output #2****Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY analytical methodology and the application of the methods to assess spatial, temporal and risk of bioavailable contaminants behavior of bioavailable contaminants in terrestrial and aquatic eco-systems with temporal variation (seasonal) and aging. new types of passive sampling devices for use as in-situ analysis of contaminants increased understanding of fish responses to PAH exposures. identify proteins that are potential new biomarkers for exposure to and effects of persistent contaminants in fish. develop analytical methodology and the application of the methods to wastewater, atmospheric samples, and to landfill leachates determine behavior of fluorochemicals in wastewater, in the atmosphere, and in landfills. determine remote atmospheric concentrations of fluorochemicals and atmospheric residence times determine the importance of snow in removing FTOHs from the atmosphere understand the fate of agricultural chemicals in various compartments of remote ecosystems. clarify the role of exogenous estrogenic compounds in the disruption of vertebral formation in fish refine agrichemical risk assessment for aquatic insects to include life history and behavior develop, refine, improve quantitative procedures that improve our ability to assess the risks that pest management practices pose to beneficial invertebrates. analytical methods and biomarkers for agricultural chemicals and other contaminants

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #3****Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH understand the regional/county variation in the epidemiology of pesticide exposures throughout the state. determine whether there is regional and/or temporal variation in the incidence of human pesticide exposures within the State of Oregon, and to identify opportunities for preventive interventions. communicate specific findings on the regional epidemiology of pesticide exposure incidents to public health officials and other agencies that oversee the use of pesticides.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Informed decision makers and citizenry Improved understanding of the spatial and temporal variability and distribution of bioavailable agricultural contaminants Fate and impact of temporal influences on bioavailable contaminants Methods and approaches for evaluating effects of aging on bioavailability of agricultural contaminants Document occurrence, exposure, fate, and treatment options of fluorochemicals in wastewater, the atmosphere, landfill leachate, snow, and crops Determine extent that landfills are a significant source of fluorochemicals and a significant extent in the crops intended for human consumption Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticides and integrated pest, nutrient, and water management. Increase ability of governments in Senegal and Mauritania, and eventually throughout the sub-region, to economically and efficiently monitor pesticides and their impacts of human and ecological systems.</p>
2	<p>Improved technology and strategies found New biomarkers of exposure to and effects of persistent contaminants in fish. Cost effective assessment of fish health in PAH contaminated aquatic ecosystems. New analytical methods and biomarkers for agricultural chemicals and other contaminants</p>
3	<p>Informed policy-making and management Data for environmental models, risk assessment, and risk management. Improved decision-making and policy on regulation of PAH in aquatic ecosystems. Predict the fate of agricultural chemicals in remote aquatic ecosystems Determine the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems Agencies that regulate or enforce the regulations relating to pesticides in the state develop policies or regulations. Able to assess trends, identify possible new issues, or assess the success of interventions</p>
4	<p>In the long run:</p> <ul style="list-style-type: none"> <li>• Risk assessment, policies and management of exposure of human and aquatic organisms to contaminants</li> <li>• Enhanced environmental quality within an economically responsible context.</li> <li>• Reduced exposure of human and aquatic organisms to fluorochemicals</li> <li>• Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S.</li> <li>• Minimize the risk of adverse impact of pesticide use on human health.</li> <li>• Build environmental public health capacity</li> </ul>

**Outcome #1****1. Outcome Measures**

Informed decision makers and citizenry Improved understanding of the spatial and temporal variability and distribution of bioavailable agricultural contaminants Fate and impact of temporal influences on bioavailable contaminants Methods and approaches for evaluating effects of aging on bioavailability of agricultural contaminants Document occurrence, exposure, fate, and treatment options of fluorochemicals in wastewater, the atmosphere, landfill leachate, snow, and crops Determine extent that landfills are a significant source of fluorochemicals and a significant extent in the crops intended for human consumption Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticides and integrated pest, nutrient, and water management. Increase ability of governments in Senegal and Mauritania, and eventually throughout the sub-region, to economically and efficiently monitor pesticides and their impacts of human and ecological systems.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

This new knowledge is required for the advancement of science-based management strategies which prevent or mitigate unacceptable adverse impacts on human and environmental health.

**What has been done**

The subprogram Fate of Bioavailable Agrichemicals and Environmental Contaminants seeks to develop sampling devices and methods to measure contaminants and effects on bioavailability. The subprogram Biomarkers for persistent contaminants in aquatic ecosystems seeks to identify proteins that are potential new biomarkers for exposure to and effects of persistent contaminants in fish. Investigators studying the Ecotoxicology of Pesticides in order to more effectively advance and transfer science to agricultural and regulatory stakeholders, will employ a variety of procedures. Investigators studying ecological risks to aquatic and terrestrial arthropods exposed to IPM practices will review and analyze existing risk assessment procedures. The subprogram Atmospheric Transport and Deposition of Agricultural Chemicals to Remote ecosystems seeks to identify, develop, and or validate trace analytical methods for agricultural chemicals and other contaminants, as well as biomarkers.

**Results**

Work in the Fate of Bioavailable Contaminants subprogram has resulted in development of technology to measure rates of reductive chlorination, which can be used to determine the feasibility of remediating contaminated groundwater. This technology has been put to use by the Environmental Restoration Office at Hickam Air Force Base to design a long-term remediation action plan. Another outcome is the finding that surrogates, or chemicals very similar to groundwater contaminants, can be used to measure in situ rates of contaminant transformation, which is a technological break-through in field experiments. In addition, this technology can be extended to identify a wide range of organic contaminants in subsurface environments. Other work has identified that fish exposed to low, environmentally realistic levels of copper had an impaired sense of smell and were less responsive to the chemical alarm signal. The current study is an example of how contaminants can disrupt the chemical ecology of aquatic organisms. In the case of salmon, a sublethal loss of sensory function may increase predation mortality in urbanized watersheds. The influence of copper on predator-prey interactions is the focus of ongoing research, with the eventual aim of linking individual survival to the productivity of wild salmon populations. Investigators studying Ecological Risks to Arthropods have identified that sublethal levels of pyrethroid, a common household insecticide, may disrupt the life cycles of caddisflies and increase rates of predation on the larvae by other aquatic insects and fish even at doses as minute as 2 parts per billion. Agricultural and urban use of the synthetic pyrethroids has become increasingly common as an alternative to the organophosphates. Increased pyrethroid use has renewed interest in expanding the understanding of the potential for adverse impacts on ecological health of aquatic systems.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
723	Hazards to Human Health and Safety
135	Aquatic and Terrestrial Wildlife
133	Pollution Prevention and Mitigation
306	Environmental Stress in Animals
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

**Outcome #2**

**1. Outcome Measures**

Improved technology and strategies found New biomarkers of exposure to and effects of persistent contaminants in fish. Cost effective assessment of fish health in PAH contaminated aquatic ecosystems. New analytical methods and biomarkers for agricultural chemicals and other contaminants

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	3	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Contaminants can disrupt the chemical ecology of aquatic organisms.

**What has been done**

Investigators studied the effects of copper on juvenile salmon.

**Results**

Fish exposed to low, environmentally realistic levels of copper had an impaired sense of smell and were less responsive to the chemical alarm signals. A sublethal loss of sensory function may increase predation mortality in urbanized watersheds.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
306	Environmental Stress in Animals
135	Aquatic and Terrestrial Wildlife
133	Pollution Prevention and Mitigation

**Outcome #3****1. Outcome Measures**

Informed policy-making and management Data for environmental models, risk assessment, and risk management. Improved decision-making and policy on regulation of PAH in aquatic ecosystems. Predict the fate of agricultural chemicals in remote aquatic ecosystems Determine the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems Agencies that regulate or enforce the regulations relating to pesticides in the state develop policies or regulations. Able to assess trends, identify possible new issues, or assess the success of interventions

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
306	Environmental Stress in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
133	Pollution Prevention and Mitigation
723	Hazards to Human Health and Safety
135	Aquatic and Terrestrial Wildlife

**Outcome #4****1. Outcome Measures**



In the long run:

- Risk assessment, policies and management of exposure of human and aquatic organisms to contaminants
- Enhanced environmental quality within an economically responsible context.
- Reduced exposure of human and aquatic organisms to fluorochemicals
- Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S.
- Minimize the risk of adverse impact of pesticide use on human health.
- Build environmental public health capacity

## 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

**What has been done**

**Results**

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
306	Environmental Stress in Animals
723	Hazards to Human Health and Safety
135	Aquatic and Terrestrial Wildlife
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### Brief Explanation

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- Other (peer reviewed)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #26****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Environmental Chemicals as Transcriptional Modulators: Understanding Health Effects as a Function of

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
723	Hazards to Human Health and Safety			100%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	2.5	0.0
<b>Actual</b>	0.0	0.0	1.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	69626	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	560000	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	974470	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

The research will utilize several model systems and several disease endpoints to understand the changes cell signaling induced in different target tissues by chemicals. Investigators worked to identify biomarkers that are expressed in response to a set of relevant model toxicants, to generate stable reporter animals using gene regulatory elements. In this research subprogram, the investigator has demonstrated that the zebrafish is an outstanding model to unravel interactions between Aryl Hydrocarbon Receptor (AHR) activation and other signal transduction pathways. The investigator is also working to screen a wide range of commonly manufactured nanomaterials to determine their potential interactions with biological systems. Ultimately, many relationships between nanomaterial composition and effects will be defined; a first step in being able to predict nanomaterial-biological interactions. In the immune suppression subprogram, the researcher has investigated the underlying mechanisms of immune suppression by which natural bioactive chemicals in food protect against human diseases such as cancer, inflammation and microbial infection, specifically focusing on the ability of three phytochemical groups: chlorophyll and its derivatives, indole-3-carbinol, and tea polyphenols. Investigators in the maternal diet subprogram have examined the potential for three of the major phytochemicals known to prevent cancer in the fetus by maternal exposure to chemical carcinogens. They are using a mouse model to study the potency and efficacy of the phytochemical groups, I3C, green tea and chlorophyllin, as transplacental chemoprotective agents. Results in this program have been disseminated through publications, presentations at local, regional, national and international meetings, and integrated into the toxicology curriculum.

**2. Brief description of the target audience**

Scientists, Medical organizations

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	100	0	0	0
2007	15	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	6	6

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	8	10

**Output #2**

**Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH For a diverse set of developmental toxicants, identify, validate, localize and characterize specific responsive genes, which have the potential to serve as biomarkers Develop a number of transgenic lines that show changes in reporter gene expression in response to toxicants Assessed risk of dioxins to humans Understand downstream pathways and novel antagonists for Ah receptor Understand immunosuppressive effects of Ahr activation Explore potential role of Ahr in thymocytes and T cells as a factor in the development of T cell lymphomas Examine chlorophylls/chlorophyllin absorption and transport across biological barriers and explore mechanism(s) of action in a mouse transplacental carcinogenesis model. Examine pathology and possible mechanisms of absorption action, primarily by employing a genomics approach. Examine dose response with DBP and I3C, examination of additional PAHs including some environmental mixtures such as diesel exhaust, coal tar and urban dust.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	7	10

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Characterize and model <ul style="list-style-type: none"> <li>• Characterization of specific responsive genes to toxicants</li> <li>• Model system to evaluate dioxin toxicity to humans</li> <li>• Role of human AhR polymorphisms and role of Arnt in mediating dioxin toxicity</li> <li>• Understand downstream effectors of and Ahr antagonists to relieve dioxin toxicity</li> <li>• Examine mechanisms that underlie the immune suppression induced by TCDD</li> <li>• Novel role for Ahr in the induction of Treg cells</li> <li>• Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals</li> </ul>
2	Develop transgenic lines of zebrafish for response to toxicants
3	Advance scientific knowledge Evaluate gene expression changes in control and toxicant exposed animals over time Ability to conduct genetic or small molecule screens for modifiers of the toxic response Risk assessment of various hydrocarbons to humans Development of agents to treat accidental human dioxin exposure or deliverate poisoning Modulate maternal diet to reduce the risk to the fetus from toxic chemicals

**Outcome #1****1. Outcome Measures**

Characterize and model

- Characterization of specific responsive genes to toxicants
- Model system to evaluate dioxin toxicity to humans
- Role of human AhR polymorphisms and role of Arnt in mediating dioxin toxicity
- Understand downstream effectors of and Ahr antagonists to relieve dioxin toxicity
- Examine mechanisms that underlie the immune suppression induced by TCDD
- Novel role for Ahr in the induction of Treg cells
- Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	5

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Results of this research program will contribute to the development and validation of new models for toxicity testing, to the identification of underlying molecular mechanisms of toxicant action, and to the ability of other chemicals to prevent or mitigate the toxic effects of environmental chemicals. Results from the model toxicants subprogram have already had a significant impact on understanding the role AHR activation and signaling cross-talk mechanisms. For the first time, there are tools to look beyond the simple AHR activation, and instead focus on the events that are actually involved in producing adverse responses to exposure to persistent environmental contaminants.

**What has been done**

The investigator has identified interactions between Aryl Hydrocarbon Receptor (AHR) activation and other signal transduction pathways. The investigator is also working to screen a wide range of commonly manufactured nanomaterials to determine their potential interactions with biological systems. Ultimately, many relationships between nanomaterial composition and effects will be defined; a first step in being able to predict nanomaterial-biological interactions. In the immune suppression subprogram, the researcher has investigated the underlying mechanisms of immune suppression by which natural bioactive chemicals in food protect against human diseases such as cancer, inflammation and microbial infection, specifically focusing on the ability of three phytochemical groups: chlorophyll and its derivatives, indole-3-carbinol, and tea polyphenols.

**Results**

Results suggest that modulation of the AHR by environmental chemicals could impact environmental and human health by the misregulation of key signaling pathways. This will be a completely new way to evaluate the role that the environment exposure to halogenated aromatic hydrocarbons plays in numerous human diseases. A related line of work that has emerged from these studies is that there are opportunities to discover novel pharmaceuticals that can be used to affect tissue regeneration.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

**Outcome #2****1. Outcome Measures**

Develop transgenic lines of zebrafish for response to toxicants

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Results of this research program will contribute to the development and validation of new models for toxicity testing, to the identification of underlying molecular mechanisms of toxicant action, and to the ability of other chemicals to prevent or mitigate the toxic effects of environmental chemicals.

**What has been done**

Investigators worked to identify biomarkers that are expressed in response to a set of relevant model toxicants, to generate stable reporter animals using gene regulatory elements.

**Results**

the investigator has demonstrated that the zebrafish is an outstanding model to unravel interactions between Aryl Hydrocarbon Receptor (AHR) activation and other signal transduction pathways.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

**Outcome #3****1. Outcome Measures**

Advance scientific knowledge Evaluate gene expression changes in control and toxicant exposed animals over time Ability to conduct genetic or small molecule screens for modifiers of the toxic response Risk assessment of various hydrocarbons to humans Development of agents to treat accidental human dioxin exposure or deliberate poisoning Modulate maternal diet to reduce the risk to the fetus from toxic chemicals

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	1

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Thirty-five percent of all cancers may be prevented by diet. Epidemiology studies confirm that individuals consuming diets with high amounts of fruits and vegetables can reduce their risk of many cancers in half. However, many individuals do not consume this level of phytochemicals in their diet. For these individuals, supplementation with these phytochemicals in pill form is an option and has become a multi-billion dollar industry. Little or no information is available on the risks/benefits of such supplementation for pregnant women with respect to the health of the fetus.

#### **What has been done**

Investigators in the maternal diet subprogram have examined the potential for three of the major phytochemicals known to prevent cancer in the fetus by maternal exposure to chemical carcinogens. They are using a mouse model to study the potency and efficacy of the phytochemicals groups, I3C, green tea and chlorophyllin, as transplacental chemoprotective agents.

#### **Results**

Work in the maternal diet subprogram has demonstrated that chemoprotection against transplacental cancer, which has important implications for human health.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
723	Hazards to Human Health and Safety

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

- Appropriations changes
- Public Policy changes
- Competing Public priorities

##### **Brief Explanation**

#### **V(I). Planned Program (Evaluation Studies and Data Collection)**

##### **1. Evaluation Studies Planned**

- Other ( )

##### **Evaluation Results**

{No Data Entered}

##### **Key Items of Evaluation**

{No Data Entered}



**Program #27**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Rangeland Ecology and Management

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	88%		88%	
125	Agroforestry	12%		12%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.4	0.0
<b>Actual</b>	0.8	0.0	2.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	71229	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1095859	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	262575	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.
- Develop Models and Protocols
- Conduct GIS analysis
  
- Develop Products, Curriculum, Resources.
  
- Assessments.
  
- Partnering. - - team development

**2. Brief description of the target audience**

- peers
- ranchers
- land managers
- policy makers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	5500	23300	125	11050
2007	250	1250	10	100

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	4	4

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	5	10

**Output #2**

**Output Measure**

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - State-and-transition models developed for riparian zones that incorporate different ecological processes than upland models. - Knowledge of functional groups and a functional group key for meadow riparian systems developed - Awareness of riparian relationships and issues associated with livestock grazing - Develop and utilize new techniques, technology, and models to characterize sagegrouse habitat, e.g., a new and simpler global positioning system as well as techniques integrating infrared wavelengths of light for more accurate classification algorithms, and on the landscape modeling side, a kinetic resource and environmental spatial systems modeler (KRESS modeler 3.0) developed in 2006 will allow predictions of the suitability of locations on landscapes for either plants or animals. - Understand the floral components and landscape features that contribute to insect biodiversity - Evaluate conservation efforts through long-term trends in population dynamics of insects and discover species previously unknown and interact with taxonomists in getting these species described

Year	Target	Actual
2007	10	10

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Informed decision-makers and citizenry - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions. - Enhance awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia. - New knowledge about ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats</p>
2	<p>Informed policy-making and management Develop and improve successful monitoring and restoration techniques utilizing the knowledge gained from water-table, channel morphology, soil relationships and the associated response in vegetation (functional groups instead of species level data).</p> <ul style="list-style-type: none"> <li>• Application of new knowledge to the development of strategies to diminish the negative impacts of grazing riparian areas. Influence policy within land management agencies on management of riparian systems through an understanding of ecological processes driving maintenance and/or restoration. Improve environmental conditions of riparian systems within the West through promotion of appropriate management decisions based on sound ecological knowledge. Increased land use and management practices to prevent encroaching species such as juniper and <i>Potentilla rect</i> More acceptance of properly managed livestock on wildland watershed. Establish and or modify existing conservation practices including monitoring protocols for biota Indices developed for understanding biodiversity.</li> </ul>
3	<p>In the long run:</p> <ul style="list-style-type: none"> <li>• Improved management of rangelands worldwide</li> <li>• Watersheds managed for soil stability, clean water production, and grazable grasslands for both a quality environment and a sustainable resource production base presents itself.</li> </ul>

**Outcome #1****1. Outcome Measures**

Informed decision-makers and citizenry - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions. - Enhance awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia. - New knowledge about ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
121	Management of Range Resources
125	Agroforestry

**Outcome #2****1. Outcome Measures**

Informed policy-making and management Develop and improve successful monitoring and restoration techniques utilizing the knowledge gained from water-table, channel morphology, soil relationships and the associated response in vegetation (functional groups instead of species level data).

- Application of new knowledge to the development of strategies to diminish the negative impacts of grazing riparian areas. Influence policy within land management agencies on management of riparian systems through an understanding of ecological processes driving maintenance and/or restoration. Improve environmental conditions of riparian systems within the West through promotion of appropriate management decisions based on sound ecological knowledge. Increased land use and management practices to prevent encroaching species such as juniper and *Potentilla rect* More acceptance of properly managed livestock on wildland watershed. Establish and or modify existing conservation practices including monitoring protocols for biota Indices developed for understanding biodiversity.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	3

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Rangelands are the dominant landscape in Oregon making up about half of the total land area of the state. Results from this program have drawn considerable interest from the public, land managers, conservationists and policymakers. Western juniper encroachment and livestock grazing in riparian systems are topics of great interest and have huge environmental and economic impact.

**What has been done**

Investigators in this program conducted research activities related to the diverse agriculture and food industries on rangelands, paying particular attention to sustainable stewardship of Oregon's land and water resources. Specific activities include analyzing hydrologic data from a paired watersheds study; long-term monitoring and development of conservation plans for sensitive Lepidoptera species worldwide; monitoring of tree and pasture production in mixed-use pastures, forests and agroforests; and development of state-and-transition models for public lands.

**Results**

The paired watersheds have demonstrated that the removal of encroached juniper encourages precipitation into the soil, increases ground cover, reduces surface erosion, provides greater recharge of soil moisture, and promotes greater seep and spring flows. The primary result of the Lepidoptera study was the development of an international standard for monitoring biological diversity of Lepidoptera by utilizing a particular protocol that allows comparison of data from any participating program anywhere in the world. The implementation of these protocols serves as the foundation for unified data analysis which, in turn, is critical to understanding patterns of biotic responses to climate change. A second impact of this project was the development of a list of 121 species of Lepidoptera in the Pacific Northwest that require special attention to monitoring and management for appropriate policy-making regarding the implementation of conservation practices. Combining timber with pasture/livestock production offers considerable promise to reduce costs needed for vegetation control in the forest stand while generating income early in the timber rotation. This increases the internal rate of return while spreading risks over several commodities (wood and livestock) that do not share common market, political, or climatic sensitivities. In addition, the combination of trees with managed ground vegetation may offer numerous environmental benefits compared to pasture or forest alone, including reduced potential for soil erosion, less movement of nutrients off site and into either surface or ground water, increased carbon sequestration, more diverse habitat for wildlife, and increased scenic beauty. An extra two weeks of grazing on high quality subclover pasture or agroforest could be significant to livestock producers, providing 7-14 additional pounds of weight gain on lambs or 15-30 lbs of weight gain on cattle. Different public agencies have adopted the state-and-transition model concepts developed by an investigator for management of public and private forest and rangelands. The incorporation of the ecological ideas of thresholds, alternative stable states, restoration pathways and resilience within different ecosystems is a major step forward in the understanding of the impacts of management decisions on ecosystem response.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
121	Management of Range Resources
125	Agroforestry

**Outcome #3****1. Outcome Measures**

In the long run:

- Improved management of rangelands worldwide
- Watersheds managed for soil stability, clean water production, and grazable grasslands for both a quality environment and a sustainable resource production base presents itself.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
125	Agroforestry
121	Management of Range Resources

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation****V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Other (peer process)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #28**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Social Change in the Marketplace: Producers, Retailers and Consumers

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
607	Consumer Economics			20%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities			80%	
<b>Total</b>				100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	0.3	0.0
<b>Actual</b>	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.
- Conduct Workshops, meetings.
- Develop Products, Curriculum, Resources.
- Assessments.
- Partnering.
- Facilitating.

**2. Brief description of the target audience**

Rural retailers will be the major target audiences as well as consumers in the changing marketplace. The outcomes of the multi-state project will provide practical and actionable information for rural retailers to improve their economic competitiveness. In addition, the outcomes of the project further provide the information that can be used to improve the well-being of consumers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	0	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	{No Data Entered}

**Patents listed**  
{No Data Entered}

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	{No Data Entered}	{No Data Entered}	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2007	0	0



## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Information Exchange: <ul style="list-style-type: none"><li>• Forum provides scientists with a resource to tap for fundable ideas for research relating to Social Change in the Marketplace.</li><li>• Exchange of information regarding research strategies and empirical techniques.</li><li>• Suggestions regarding strategies not previously considered</li></ul>
2	Collaborations: <ul style="list-style-type: none"><li>• Partnerships and mutual interests result in new collaborative research efforts. Input from a variety of scientists with expertise in multiple research strategies and empirical techniques will raise the level of the work.</li></ul>
3	In the long run, Collaborations result in more and better ideas and projects

**Outcome #1****1. Outcome Measures**

Information Exchange:

- Forum provides scientists with a resource to tap for fundable ideas for research relating to Social Change in the Marketplace.
- Exchange of information regarding research strategies and empirical techniques.
- Suggestions regarding strategies not previously considered

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	0

**3c. Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)

What has been done

Results

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
607	Consumer Economics
803	Sociological and Technological Change Affecting Individuals, Families and Communities

**Outcome #2****1. Outcome Measures**

Collaborations:

- Partnerships and mutual interests result in new collaborative research efforts. Input from a variety of scientists with expertise in multiple research strategies and empirical techniques will raise the level of the work.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
607	Consumer Economics
803	Sociological and Technological Change Affecting Individuals, Families and Communities

**Outcome #3****1. Outcome Measures**

In the long run, Collaborations result in more and better ideas and projects

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
607	Consumer Economics
803	Sociological and Technological Change Affecting Individuals, Families and Communities

**V(H). Planned Program (External Factors)****External factors which affected outcomes**

- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation**

{No Data Entered}

**V(I). Planned Program (Evaluation Studies and Data Collection)****1. Evaluation Studies Planned**

- Other ()

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #29**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

Families, Youth, and Communities

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being			70%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures			30%	
<b>Total</b>				100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.2	0.0	1.1	0.0
<b>Actual</b>	0.0	0.0	1.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	3096	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	108973	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	29054	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

- Conduct Research Experiments.
- Develop Products, Curriculum, Resources.
- Provide Training.
- Assessments.
- Partnering.

**2. Brief description of the target audience**

- extension educators.
- commercial producers.
- youth aged 13-18.
- elderly residents
  - rural residents
  - Latino populations
- economists.
- policy makers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	150	250	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year	Target
Plan:	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	Extension	Research	Total
Plan			
2007	0	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	2

**Output #2****Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH
  - Data set of community contextual variables created from identified secondary sources
  - Primary data set created from three waves of qualitative and quantitative data, resulting in the most comprehensive data set on low-income rural family well being available in the U.S.
  - Ph.D. trained researchers from four states who understand rural low-income families and complex research projects. Characterize and assess the fibers' chemical, physical and performance properties that are relevant to textile thermal insulation applications. The thermal insulation capability of comforters made of poplar seed hair fibers has been found to outperform those made of wool, down, or other synthetic fibers, and therefore, it is expected that the results of this project would demonstrate that poplar seed hair fibers possess properties are suitable for textile thermal insulation applications.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	2

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Information exchange</p> <ul style="list-style-type: none"> <li>• Data set of community contextual variables and the most comprehensive data set on low-income rural family well being available in the U.S.</li> <li>• Doctoral researchers from four states who understand rural low-income families and complex research projects.</li> <li>• Better-trained scholars who are adept at using qualitative and quantitative data and have experiences in producing research outcomes that are qualitative and/or quantitative, and based in a context of policy.</li> <li>• Better-trained extension educators to meet needs of rural low-income families through the development of programs based on the findings within the context of policy.</li> </ul>
2	<p>Models</p> <ul style="list-style-type: none"> <li>• Development of conceptual model to promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities</li> </ul>
3	<p>Products and services</p> <ul style="list-style-type: none"> <li>• Poplar fibers are demonstrated to be promising as a high-end bulk thermal insulation material</li> <li>• Introduction of a natural, presumably non-toxic, biodegradable, and sustainable resource for textile thermal insulation</li> </ul>
4	<p>Informed policy-making and management Improved welfare policy at the federal level that addresses the needs of rural families and communities Improved welfare policy at the state level that takes into account the needs of rural families and communities Improved outreach, education, and professional practice in serving the needs of rural low-income families Improved well-being and functioning of rural low-income families based on findings from a project that considered policy context in the original design Development of programmatic interventions that reduce the physical inactivity and promote well being</p>
5	<p>In the long run:</p> <ul style="list-style-type: none"> <li>• Improved well being of lower-income and ethnic minority youth across rural America</li> <li>• Use of poplar seed fibers will positively impact the economic value of this U.S. agricultural industry</li> </ul>



**Outcome #1****1. Outcome Measures**

Information exchange

- Data set of community contextual variables and the most comprehensive data set on low-income rural family well being available in the U.S.
- Doctoral researchers from four states who understand rural low-income families and complex research projects.
- Better-trained scholars who are adept at using qualitative and quantitative data and have experiences in producing research outcomes that are qualitative and/or quantitative, and based in a context of policy.
- Better-trained extension educators to meet needs of rural low-income families through the development of programs based on the findings within the context of policy.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	5	4

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

Rural populations face on-going challenges of health and well-being.

**What has been done**

Work on this program has focused on the impact of intergenerational resource transfers on family and maternal well being; differing access to resources of Hispanic and non-Hispanic families; child care arrangements for preadolescent children; and, contributions of non-custodial fathers and the well-being of single mother families.

**Results**

Results from this study have been used to shape further research with a local food security agency linking community food security, obesity and access to physical activity for low-income children in a local area. The principal investigator served as an evaluation consultant on two USDA Community Food Security projects as a result of her work. The first project helped to support the development of community gardens designed to increase physical activity and support healthy eating patterns of low-income children. The second project has worked to link faith-based congregations with low-income and immigrant farmers in Corvallis and Portland.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being

**Outcome #2****1. Outcome Measures**

Models

- Development of conceptual model to promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being

**Outcome #3****1. Outcome Measures**

Products and services

- Poplar fibers are demonstrated to be promising as a high-end bulk thermal insulation material
- Introduction of a natural, presumably non-toxic, biodegradable, and sustainable resource for textile thermal insulation

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

**Outcome #4**

**1. Outcome Measures**

Informed policy-making and management Improved welfare policy at the federal level that addresses the needs of rural families and communities  
 Improved welfare policy at the state level that takes into account the needs of rural families and communities Improved outreach, education, and professional practice in serving the needs of rural low-income families  
 Improved well-being and functioning of rural low-income families based on findings from a project that considered policy context in the original design  
 Development of programmatic interventions that reduce the physical inactivity and promote well being

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
802	Human Development and Family Well-Being

**Outcome #5****1. Outcome Measures**

In the long run:

- Improved well being of lower-income and ethnic minority youth across rural America
- Use of poplar seed fibers will positively impact the economic value of this U.S. agricultural industry

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Populations changes (immigration,new cultural groupings,etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

- 

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #30****V(A). Planned Program (Summary)****1. Name of the Planned Program**

Human Nutrition, Food Safety, and Human Health and Well Being

**V(B). Program Knowledge Area(s)****1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components			68%	
703	Nutrition Education and Behavior			8%	
724	Healthy Lifestyle			24%	
	<b>Total</b>			100%	

**V(C). Planned Program (Inputs)****1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.2	0.0	2.6	0.0
<b>Actual</b>	0.0	0.0	2.3	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	11962	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	184038	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	94312	0

**V(D). Planned Program (Activity)****1. Brief description of the Activity**

This program proposes to study the dietary effects of food nutrients in preventing cancer and heart disease. This program will also take an integrated approach to the prevention of obesity and osteoporosis in high risk family, looking at food intake, dietary patterns, family and peer interactions, as well as economic, social and policy factors in the prevention and control of these diseases among white, Hispanic and Asian populations. Specifically, investigators have sought to understand the role of dietary supplements on a molecular level. Results from one lab suggest that zinc plays an important role in protecting the cell from DNA damage and oxidative stress. Zinc deficiency provides an environment for increased DNA damage, an inability to respond to stress and risks for cancer. This research addresses the importance of getting adequate zinc from zinc-rich foods to improve health. Other investigators have developed a chemical proteomics screen to identify the protein target and the site of the modification by a lipid peroxidation product. The findings indicate that more studies are necessary to fully understand the biochemical effects of EGCG, a plant polyphenol, and to justify its potential use as a health-promoting dietary supplement. Additionally, this work helps to define the molecular mechanisms of oxidation of cellular proteins and the contribution of those modifications to the pathology of tissue damage during inflammation, disease and aging.

**2. Brief description of the target audience**

- youth aged 13-18
- economists
- nutritionist
- policy makers
- social program agencies

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

**Target for the number of persons (contacts) reached through direct and indirect contact methods**

	<b>Direct Contacts Adults</b>	<b>Indirect Contacts Adults</b>	<b>Direct Contacts Youth</b>	<b>Indirect Contacts Youth</b>
<b>Year</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>	<b>Target</b>
<b>Plan</b>	0	0	0	0
2007	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

<b>Year</b>	<b>Target</b>
<b>Plan:</b>	0
2007 :	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Plan</b>			
2007	0	3	3

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #2**

**Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms. test the ability of zinc supplementation to reduce the incidence of prostate cancer via modification of prostate inflammation, oxidative damage and DNA damage/repair. identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults new or improved intervention strategies for implementation in the community setting. and tools for measuring the effectiveness of the interventions targeted to childhood overweight in low income families. Identification of objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring interventions in ways that will be most effective for specific groups and subgroups. Identification of key parent-child relationships that contribute to childhood overweight and resiliency in various populations.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	3	3

## V(G). State Defined Outcomes

## V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	<p>Informed decision-makers and citizenry</p> <ul style="list-style-type: none"> <li>• Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer               <ul style="list-style-type: none"> <li>o Establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms.</li> <li>o Understand mechanisms of how zinc deficiency alters DNA integrity.</li> </ul> </li> <li>• Gain knowledge of the mechanisms behind the health benefits of cruciferous vegetables.</li> <li>• Develop an understanding of motivations for food choice and strategies to impact them and identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults               <ul style="list-style-type: none"> <li>• new or improved obesity intervention strategies in the community setting</li> <li>• Objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions</li> <li>• key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors</li> <li>• understanding of various inputs and interactions of family and child, SES, nutrition, physiology and behavior</li> </ul> </li> </ul>
2	<p>Best Practices Assist and influence food service vendors to find successful strategies for marketing healthful food options Influence school policies for offering/encouraging healthful foods Markers and strategies will become the standards of methods and measurement of childhood overweight and resiliency. More effective programs and student experiences</p>
3	<p>Improved technologies and practices found Markers for oxidative stress and DNA integrity would potentially lead to novel approaches for identifying biomarkers of zinc deficiency in humans. Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer Effective dietary intervention strategies that are broadly applicable and public health recommendations that will significantly reduce the burden of prostate cancer. Advances in the study of obesity</p>
4	<p>In the long run: Reduce health care costs associated with prostate cancer Improve the quality of life of thousands of American men Control the growth in the rate of obesity and osteoporosis among youth Solutions reverse trends in childhood obesity</p>

**Outcome #1****1. Outcome Measures**

Informed decision-makers and citizenry

- Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer
  - o Establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms.
  - o Understand mechanisms of how zinc deficiency alters DNA integrity.
- Gain knowledge of the mechanisms behind the health benefits of cruciferous vegetables.
- Develop an understanding of motivations for food choice and strategies to impact them and identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults
- new or improved obesity intervention strategies in the community setting
- Objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions
- key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors
- understanding of various inputs and interactions of family and child, SES, nutrition, physiology and behavior

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
724	Healthy Lifestyle
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

**Outcome #2****1. Outcome Measures**



Best Practices Assist and influence food service vendors to find successful strategies for marketing healthful food options Influence school policies for offering/encouraging healthful foods Markers and strategies will become the standards of methods and measurement of childhood overweight and resiliency. More effective programs and student experiences

## 2. Associated Institution Types

•1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

**What has been done**

**Results**

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
703	Nutrition Education and Behavior
702	Requirements and Function of Nutrients and Other Food Components

## Outcome #3

### 1. Outcome Measures

Improved technologies and practices found Markers for oxidative stress and DNA integrity would potentially lead to novel approaches for identifying biomarkers of zinc deficiency in humans. Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer Effective dietary intervention strategies that are broadly applicable and public health recommendations that will significantly reduce the burden of prostate cancer. Advances in the study of obesity

### 2. Associated Institution Types

•1862 Research

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

This program will also take an integrated approach to the prevention of obesity and osteoporosis in high risk family, looking at food intake, dietary patterns, family and peer interactions, as well as economic, social and policy factors in the prevention and control of these diseases among white, Hispanic and Asian populations. This research addresses the importance of getting adequate zinc from zinc-rich foods to improve health.

#### What has been done

Specifically, investigators have sought to understand the role of dietary supplements on a molecular level.

#### Results

Results from one lab suggest that zinc plays an important role in protecting the cell from DNA damage and oxidative stress. Zinc deficiency provides an environment for increased DNA damage, an inability to respond to stress and risks for cancer. Other investigators have developed a chemical proteomics screen to identify the protein target and the site of the modification by a lipid peroxidation product. The findings indicate that more studies are necessary to fully understand the biochemical effects of EGCG, a plant polyphenol, and to justify its potential use as a health-promoting dietary supplement. Additionally, this work helps to define the molecular mechanisms of oxidation of cellular proteins and the contribution of those modifications to the pathology of tissue damage during inflammation, disease and aging.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
724	Healthy Lifestyle
703	Nutrition Education and Behavior

#### Outcome #4

##### 1. Outcome Measures

In the long run: Reduce health care costs associated with prostate cancer  
 Improve the quality of life of thousands of American men  
 Control the growth in the rate of obesity and osteoporosis among youth  
 Solutions reverse trends in childhood obesity

##### 2. Associated Institution Types

•1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

##### 3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Public Policy changes
- Competing Public priorities

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**1. Evaluation Studies Planned**

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**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

**Program #31**

**V(A). Planned Program (Summary)**

**1. Name of the Planned Program**

New and Improved Food Processing Systems to Ensure a Safe, Wholesome and High-Value Food Supply

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	32%		32%	
502	New and Improved Food Products	41%		41%	
511	New and Improved Non-Food Products and Processes	17%		17%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	2%		2%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	8%		8%	
<b>Total</b>		100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2007	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.5	0.0	9.1	0.0
<b>Actual</b>	1.5	0.0	8.3	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	112172	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1725772	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	523910	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Investigators in this program conducted experimental approaches to develop new and improved food processing systems to ensure a safe, wholesome and high-value food supply. Specific focus was placed on the following food products: fish and shellfish, fresh and processed berry fruits, and wine and beer. In the fish and shellfish subprogram, investigators developed value-added products through applied research and product development activities. Further research continues into production of salmon-waste and sardine products. Investigators also conducted studies to investigate foodborne illnesses from raw shellfish consumption, specifically, *V. parahaemolyticus*, the leading cause of human gastroenteritis, in oysters and histamine producing bacteria (HPB), the leading cause of scombroid poisoning, in fish. Studies looked into the effects of temperature depuration on *V. parahaemolyticus* and electrolyzed oxidizing water (EOW) treatments on HPB. The fresh and processed berry fruits investigators developed methods to reduce incidence of foodborne illnesses through intervention processing technologies. They worked to determine the effect of EOW as a surface disinfectant on the surface microflora of fresh strawberries and blueberries. They also developed edible coatings to extend the shelf life of these products. The enology research subprogram focused on factors that affect wine quality, such as texture and aroma. Investigators learned how the release of yeast mannoproteins increase texture and mouthfeel and developed a method for identifying wine proteins. Another study investigated the impact of deficit irrigation on wine aroma composition. Fermentation science faculty investigated the role hops (*humulus lupulus*) constituents have on beer bitterness and flavor stability. Investigators conducted experiments in which they dosed these compounds in an unhopped base beer and used a panel of human subjects to assess differences in bitterness intensity and quality. In addition, they examined these same components for their impact on beer foam stability. Results from this program were disseminated through reports, publications, workshops, consumer seminars, and industry consultations.

## 2. Brief description of the target audience

The proposed program has numerous target audiences:

- State and federal food regulatory policy makers
- University, state, federal and industry scientists
- Commodity groups (dairy, seafood, fruit, vegetable, winegrape)
- Food processing industry
- Science educators
- Agricultural and natural resource stakeholders
- Food consumers

## V(E). Planned Program (Outputs)

### 1. Standard output measures

#### Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3000	5000	500	2000
2007	620	1200	0	750

### 2. Number of Patent Applications Submitted (Standard Research Output)

#### Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

#### Patents listed

### 3. Publications (Standard General Output Measure)

#### Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	24	24

## V(F). State Defined Outputs

### Output Target

**Output #1****Output Measure**

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	53	50

**Output #2****Output Measure**

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTION

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	5

**Output #3****Output Measure**

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	2	2

**Output #4****Output Measure**

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	1	1

**Output #5****Output Measure**

- DEVELOP DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2007	5	0

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

<b>O No.</b>	<b>OUTCOME NAME</b>
1	Distance and Extension education regarding food safety, food processing, value-added foods, food packaging. Information targeted to consumers, food processing industry, and government agency / regulatory decision-makers.
2	Knowledge generation and databases of food safety and food processing technologies; flavor / ingredient databases that relate to food quality parameters. As a result of this program individuals and industry will modify food production and handling practices. Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses.
3	Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. Another expected outcome is to provide intervention strategies to reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.

**Outcome #1****1. Outcome Measures**

Distance and Extension education regarding food safety, food processing, value-added foods, food packaging. Information targeted to consumers, food processing industry, and government agency / regulatory decision-makers.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	10	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #2****1. Outcome Measures**

Knowledge generation and databases of food safety and food processing technologies; flavor / ingredient databases that relate to food quality parameters. As a result of this program individuals and industry will modify food production and handling practices. Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses.

**2. Associated Institution Types**

•1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**



**What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

**Outcome #3****1. Outcome Measures**

Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. Another expected outcome is to provide intervention strategies to reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2007	0	10

**3c. Qualitative Outcome or Impact Statement****Issue (Who cares and Why)**

This program will advance fundamental knowledge about food, nutrition and health.

**What has been done**

Investigators in this program conducted experimental approaches to develop new and improved food processing systems to ensure a safe, wholesome and high-value food supply. Specific focus was placed on the following food products: fish and shellfish, fresh and processed berry fruits, and wine and beer. In the fish and shellfish subprogram, investigators developed value-added products through applied research and product development activities. Further research continues into production of salmon-waste and sardine products. Investigators also conducted studies to investigate foodborne illnesses from raw shellfish consumption, specifically, *V. parahaemolyticus*, the leading cause of human gastroenteritis, in oysters and histamine producing bacteria (HPB), the leading cause of scombroid poisoning, in fish. Studies looked into the effects of temperature depuration on *V. parahaemolyticus* and electrolyzed oxidizing water (EOW) treatments on HPB. The fresh and processed berry fruits investigators developed methods to reduce incidence of foodborne illnesses through intervention processing technologies. They worked to determine the effect of EOW as a surface disinfectant on the surface microflora of fresh strawberries and blueberries. They also developed edible coatings to extend the shelf life of these products. The enology research subprogram focused on factors that affect wine quality, such as texture and aroma. Investigators learned how the release of yeast mannoproteins increase texture and mouthfeel and developed a method for identifying wine proteins. Another study investigated the impact of deficit irrigation on wine aroma composition. Fermentation science faculty investigated the role hops (*humulus lupulus*) constituents have on beer bitterness and flavor stability. Investigators conducted experiments in which they dosed these compounds in an unhopped base beer and used a panel of human subjects to assess differences in bitterness intensity and quality. In addition, they examined these same components for their impact on beer foam stability.

## Results

Low-temperature depuration appears to be a simple and inexpensive process for reducing contamination in oysters without adverse effects on the oysters. The process can easily be adopted by the industry for producing raw oysters for safe consumption. Scombroid poisoning, caused by histamine intoxication, is one of the most prevalent illnesses associated with seafood consumption in the U.S. Treatments of EO water completely inactivated the inoculated bacteria on food contact surfaces. The development of specific intervention processing technologies will provide mechanisms to ensure not only safe products but also products of the highest nutritional value and of desirable sensory characteristics. Outbreaks of foodborne illness associated with fresh and minimally processed fruits have raised interest to develop alternative food disinfection systems. Acidic EO water has attracted interest from the food industry as a promising technology for sanitation and microbial inactivation. Other investigative work suggested that edible coatings may be beneficial for retaining quality of fresh blueberries. This technology provided potential to develop ready-to-eat fresh blueberry for the commercial market. The key to the continued economic health of the Oregon wine industry is the high quality of its wines, as the relatively small scale of production in the state will never make the wines competitive on a volume basis. Developing and refining grape growing and winemaking practices that enhance wine quality have the greatest possibility of being economically beneficial. To this end, investigators developed a standard immunoblot procedure for quantifying yeast mannoproteins in wine protein extract, which increase texture, an important indicator of wine quality. Investigators have also proved that a successful correlation between the aroma composition in grape and wine aroma quality will be a major milestone for evaluating grape quality. The results demonstrated that despite annual differences in amount of all aroma volatiles, in each of three years of this study, deficit irrigation during berry development had a consistent effect on the aroma composition of the wine. Beer flavor and its inherent flavor stability are dependent on many factors including raw material quality and processing regimes. The addition of these polyphenol extracts increased ferric reducing antioxidant potential (FRAP) values, thereby confirming our initial hypothesis of a positive antioxidant effect of hop polyphenols in beer. With additional work on the extraction technique, they were also able to demonstrate positive results using electron paramagnetic resonance (EPR) analysis.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

### V(H). Planned Program (External Factors)

#### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

#### Brief Explanation

### V(I). Planned Program (Evaluation Studies and Data Collection)

#### 1. Evaluation Studies Planned

- Other (peer process)

#### Evaluation Results

{No Data Entered}

#### Key Items of Evaluation

{No Data Entered}